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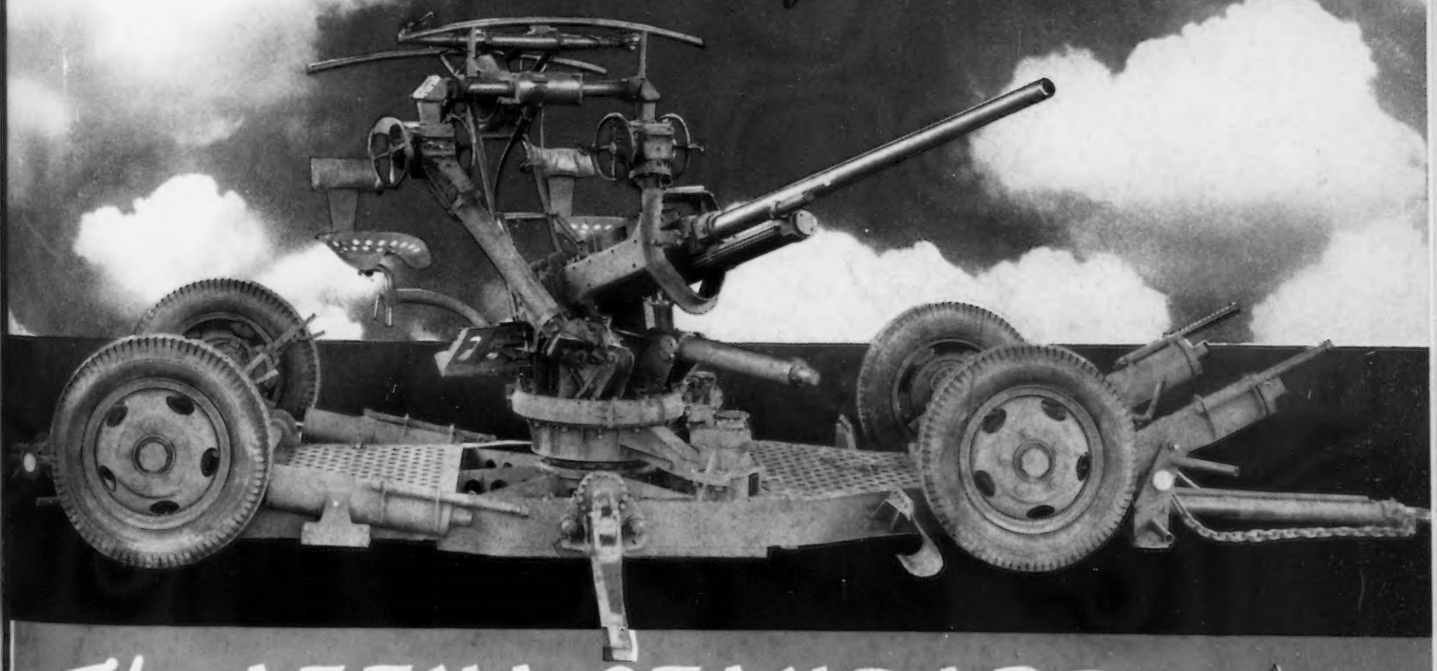

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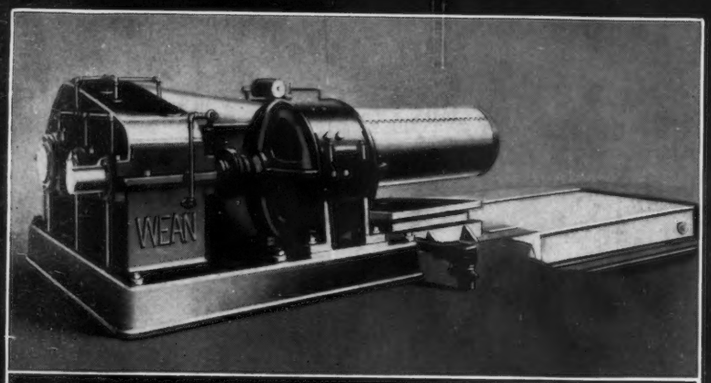

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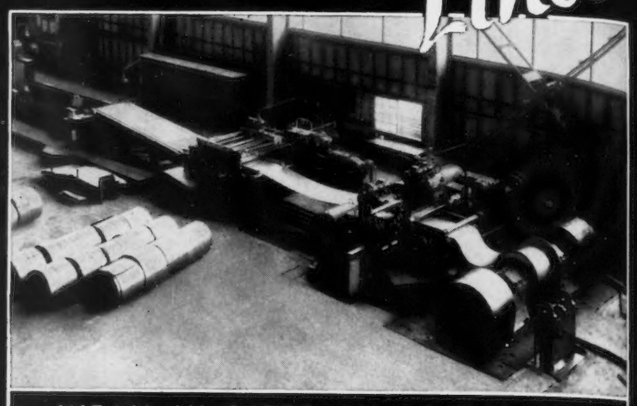

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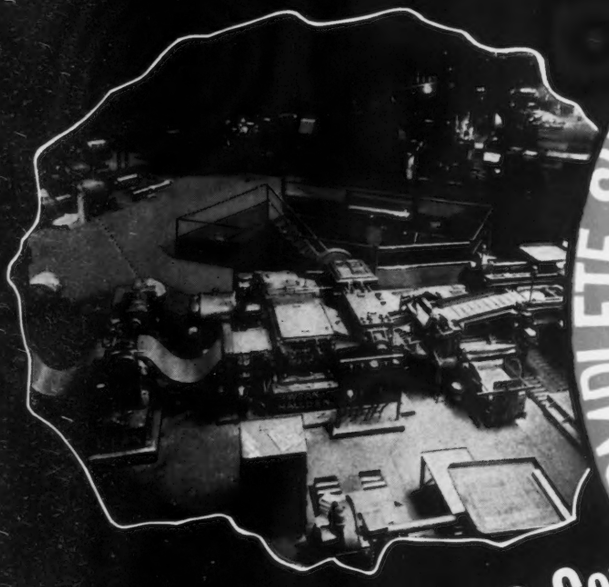

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JULY 31, 1941

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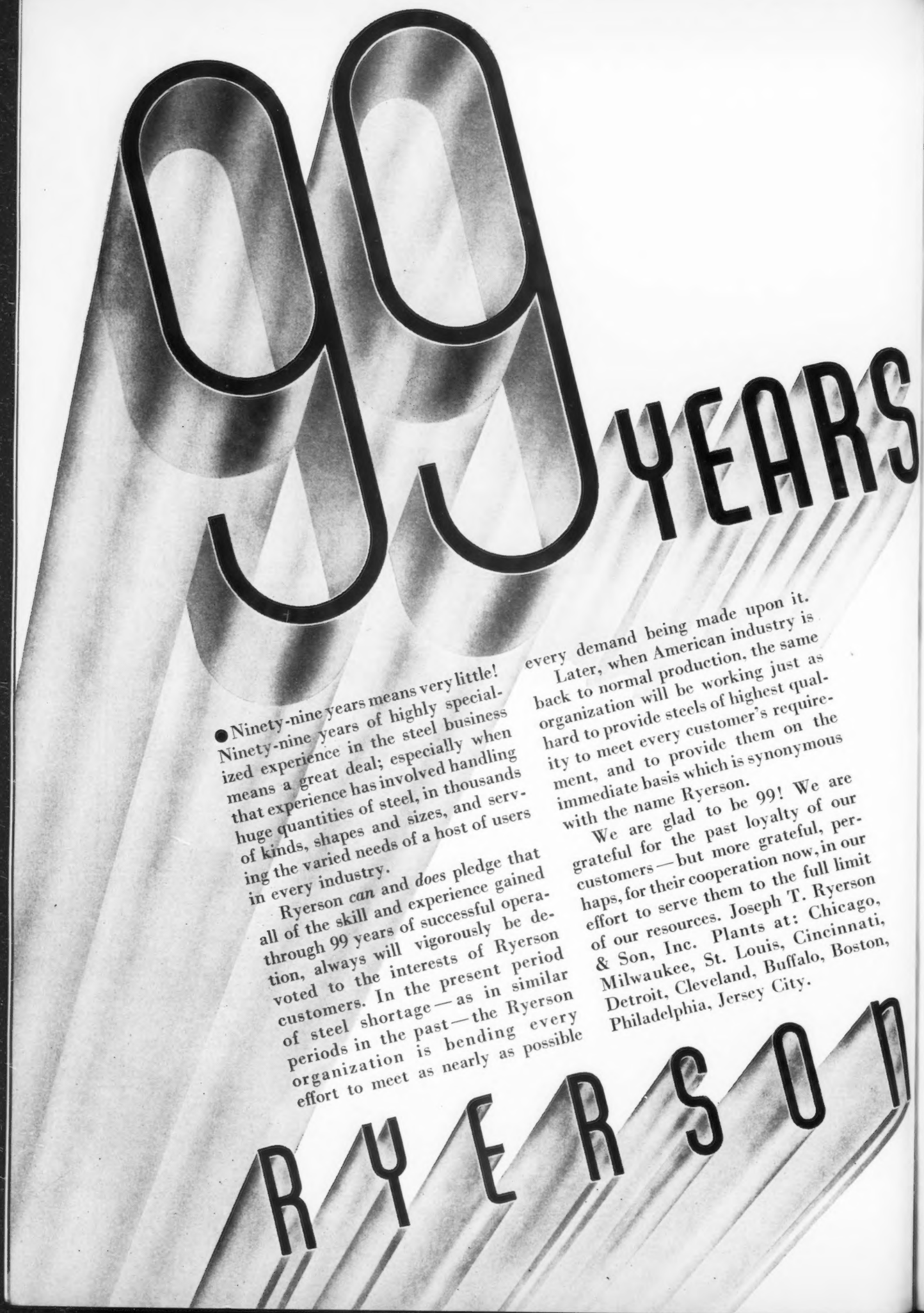

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The Iron Age

JULY 31, 1941

ESTABLISHED 1855

Managing Time

"TIME is money." Yes, and time is almost everything else in addition.

Every capable industrial executive knows this to be true and therefore spends a great deal of time in managing time. This truth applies up and down the line, from foreman to president and vice versa.

The foreman deals with a comparatively small section of time as compared with that managed by the chief executive. The foreman's job is to make his department "run like a watch," so that there are no missing minutes in each hour of production. He manages the time of the men who work under him.

The production manager handles a broader section of time. His job is not with individuals but departments. He must so manage departmental time, and synchronize it, that the various outputs come together to meet and fulfill the general manufacturing schedule.

The chief executive officer handles a still larger section of time. It is his job to relate the production schedule to plant capacity and both of these to consumer demand. It is also a part of his job, and a vitally important one, to see to it that the finished orders get to the customers.

To have a really efficient organization, you must have capable time managers in each different capacity. The most capable foremen would have their efforts completely nullified by an incapable production manager. And given good time managers in both of these capacities, their work would go for naught unless there were an able chief executive who could so manage time that the goods would reach the customer when needed.

In our defense program, which is a manufacturing and merchandising operation greatly magnified, the manufacturing concerns of America correspond to the foremen in this analogy. The OPM corresponds to the production manager. In both instances we have experienced and capable time managers who know how to do what they are given to do.

When it comes to the general management of the program and particularly the responsibility of getting the goods to the customer, the situation is not so clear. Mr. Knudsen's responsibilities end with production. The general timing of the program as a whole and the responsibility of delivery are in other hands. Whether these hands are capable of doing their work, we shall soon discover. If not we will possibly see the greatest piling up of finished goods inventories that the world has yet experienced.

J. H. Van Deventer

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Inland Copper-Alloy Steel resists corrosion far better than ordinary steel. This is proved by many years of experience in widely varied service applications under most industrial, rural and sea coast atmospheric conditions, as well as by Government, technical society and private tests.

Typical of these tests is the eleven-year test rack exposure conducted on open hearth pure iron, copper iron, non-copper bearing and copper bearing steel sheets by A. S. T. M. Committee A-5. One of these tests, made at Fort Sheridan, Ill., resulted in failure of the first non-copper bearing 22 gauge (1/32 inch thick) steel sheet at the end of 32 months. The initial failure of a copper bearing steel sheet of the same gauge occurred 132 months after the start of the test—an added life of 100 months.

The experiences of manufacturers and users have been that the exceptional corrosion resistance of Inland Copper-Alloy Steel quickly pays for its very slight additional cost. Equipment and structures made of Copper-Alloy Steel last many times longer when exposed to atmospheric corrosion, and maintenance costs are drastically reduced. Time lost for making repairs is cut to the minimum. Its workability and physical characteristics are the same as non-copper bearing steel.

Inland Copper-Alloy Steel can be specified in all rolled forms, such as; sheets (galvanized and plain), strip, bars, structural shapes, plates, sheet piling and floor plate.

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Some Effects of Titanium on

Low Carbon 1 Per Cent Chromium Steel

By JOHN N. PAPPAS
Formerly, Metallurgical Department, Titanium Alloy Mfg. Co.,
and
MORRIS COHEN
Department of Metallurgy, Massachusetts Institute of Technology

o o o

IT has been shown by G. F. Comstock[1] that the presence of small amounts of titanium in forged pearlitic manganese steels materially improves the ductility and impact resistance without unduly sacrificing the high strength characteristics induced by the manganese. These results suggested the possible use of titanium for toughening purposes in other alloy steels in which the principal alloy is a hardening element.

Accordingly, it was decided to investigate the effects of titanium on the mechanical properties of a 1 per cent chromium steel containing 0.20 per cent carbon. Vanadium is used commercially in such a chromium steel (S.A.E. 6120) to enhance the ductility and impact properties, and in view of the analogous carbide and oxide-forming tendencies of vanadium and titanium, it was deemed advisable to ascertain the relative effects of these two elements in the chromium steel.

The steels studied in this investigation were prepared in a 17-lb. induction furnace at the laboratory of the Titanium Alloy Mfg. Co. While tests on such small heats may not be considered as entirely conclusive, it was felt that comparative trends would be disclosed. All the steels were made with the same scrap charge, and received the same chromium addition. The ferrochromium used for this purpose contained 68.83 per cent chromium and 5.32 per cent carbon. Chemical analyses showed that the basic compositions of all the steels ranged within the following acceptable limits: 0.18 to 0.22 per cent carbon, 0.42 to 0.50 manganese, 0.021 to 0.045 sulphur, 0.019 to 0.034 phosphorus, 0.22 to 0.30 silicon, 0.98 to 1.06 chromium.

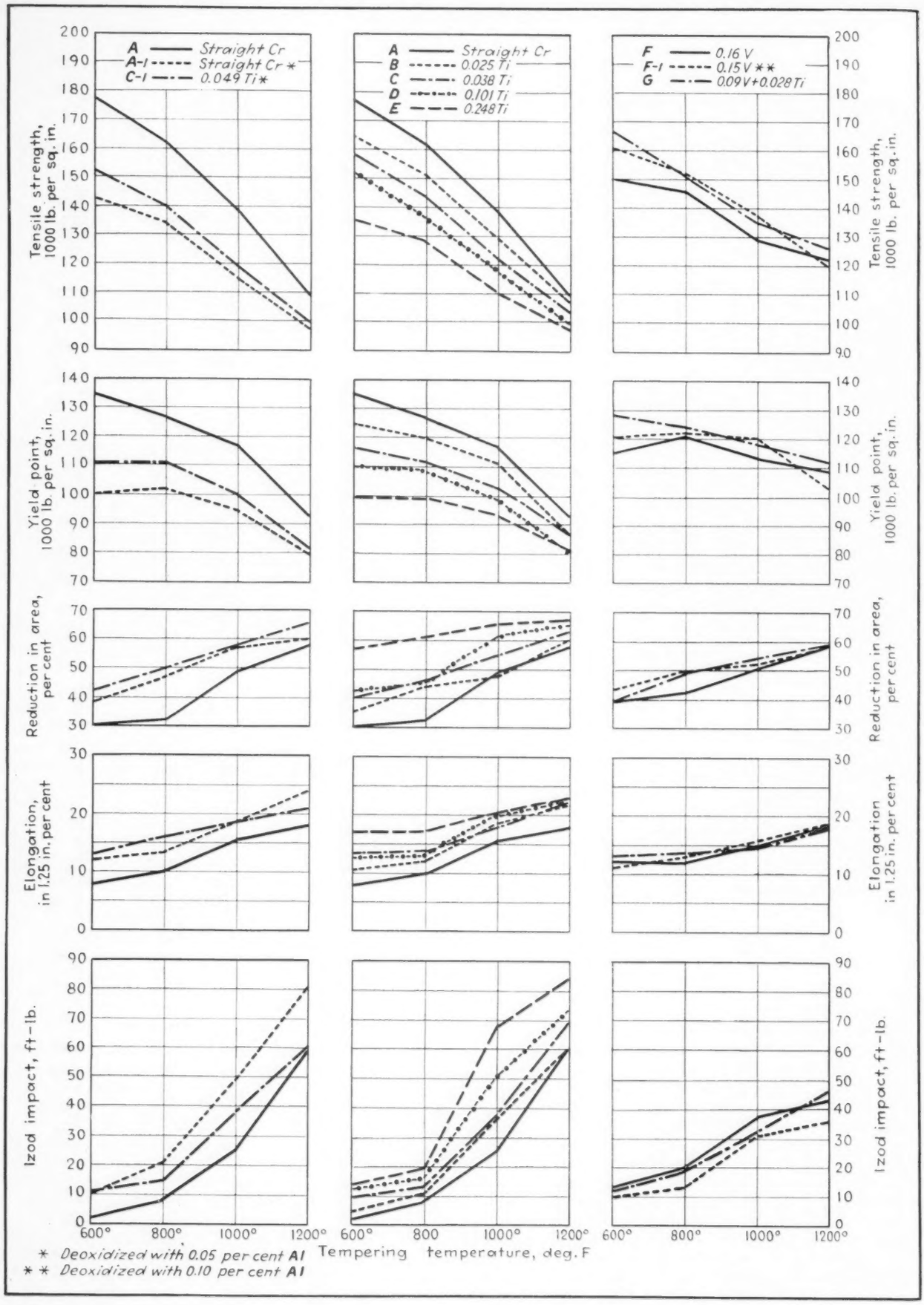
The various special additions to this straight chromium steel are shown in Table I. Steel A represented the basic analysis, while A-1 was the same composition deoxidized with aluminum. The latter heat was designed to develop an "inherently" fine grain size in the straight-chromium steel so that a comparison with the titanium treated steels would indicate whether the alloying effect of the titanium could be attributed simply to its grain refining action. The titanium added to all the titanium-bearing steels in Table I was in the form of low-carbon ferro-titanium containing 40.38 per cent titanium, 7.02 per cent aluminum, 3.51 per cent silicon and 0.04 per cent carbon. Steel C-1 was included to determine whether the combined action of the aluminum and titanium would yield properties not obtainable with either element independently. The vanadium-bearing steels F (without aluminum deoxidation) and F-1 (with aluminum deoxidation) were considered representative of the S.A.E. 6120 analysis. The ferro-vanadium used contained 40.01 per cent vanadium, 1.97 per cent silicon and 0.055 per cent carbon. Steel G was similar to steel F except that a part of the latter's vanadium content was replaced by titanium.

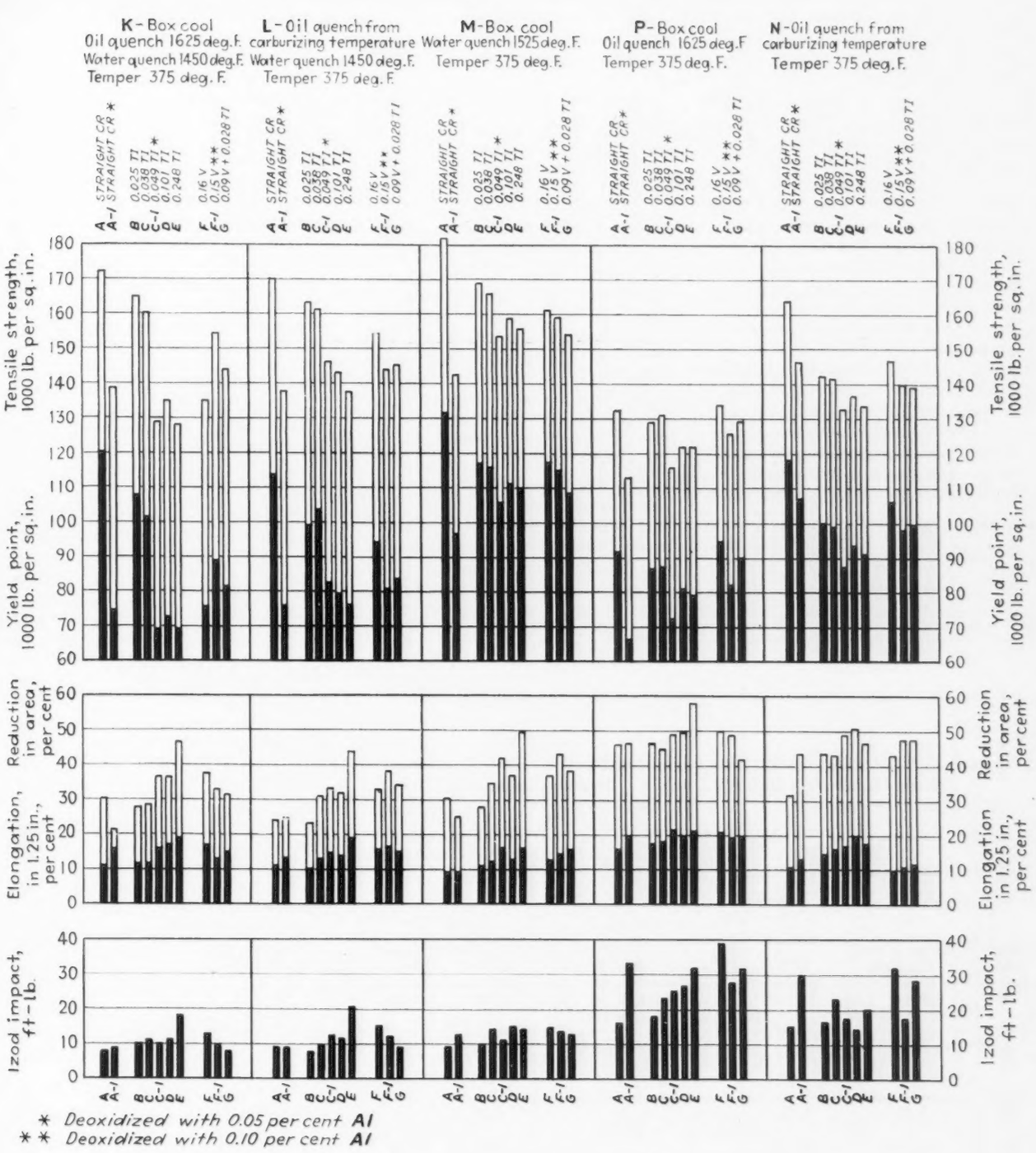
The above steels were forged from 3-in. square ingots into ¾-in. round bars for the tensile tests and into 9/16-in. square bars for the impact tests. The forged bars were inspected by radiographic and hot acid etching methods to insure soundness and reasonable freedom from segregation. The bars were then normalized for 1 hr. at 1650 deg. F., and cut into suitable lengths for the various heat treatments. Following these heat treatments, the bars were machined into standard Izod impact specimens and sub-size tensile specimens having a 1.25-in. gage length and a 0.313-in. diameter. The detailed dimensions of these specimens are given on pages 135 and 132 respectively of the *A. S. M. Metals Handbook*, 1939.

Grain Size

The grain growth characteristics of the steels were established by two methods: (1) by heating at temperatures in the range of 1650 deg. to 2050 deg. F. for 1 hr., and then interrupting the cooling at 1450 deg. F. for ½ hr. to outline the grains with ferrite; and (2) by carburizing at temperatures in the range of 1650 deg. to 2050 deg. F. for 8 hr., and then cooling slowly to outline the grains with cementite. Both of these methods of grain size determination were em-

[1] G. F. Comstock, "Effect of Titanium and Vanadium on Forged Pearlitic Manganese Steel," THE IRON AGE, Feb. 16, 1939, vol. 143, p. 27.


A — Straight Cr
A-1 ----- Straight Cr *
C-1 —·— 0.049 Ti *
A — Straight Cr
B ----- 0.025 Ti
C —·— 0.038 Ti
D ·····0.101 Ti
E — — 0.248 Ti
F — 0.16 V
F-1 ----- 0.15 V **
G —·— 0.09 V+0.028 Ti
Tensile strength, 1000 lb. per sq. in.
Yield point, 1000 lb. per sq. in.
Reduction in area, per cent
Elongation, in 1.25 in. per cent
Izod impact, ft-lb.
600° 800° 1000° 1200°
Tempering temperature, deg. F
* Deoxidized with 0.05 per cent Al
** Deoxidized with 0.10 per cent Al


K - Box cool
Oil quench 1625 deg. F.
Water quench 1450 deg. F.
Temper 375 deg. F.
L - Oil quench from
carburizing temperature
Water quench 1450 deg. F.
Temper 375 deg. F.
M - Box cool
Water quench 1525 deg. F.
Temper 375 deg. F.
P - Box cool
Oil quench 1625 deg. F
Temper 375 deg. F.
N - Oil quench from
carburizing temperature
Temper 375 deg. F.
Tensile strength, 1000 lb. per sq. in.
Yield point, 1000 lb. per sq. in.
Reduction in area, per cent
Elongation in 1.25 in., per cent
Izod impact, ft-lb.
* Deoxidized with 0.05 per cent Al
** Deoxidized with 0.10 per cent Al

LEFT

FIG. 1—Mechanical properties of quenched and tempered steels. Base analysis: 0.20 C, 1.00 Cr. Heat treatment as follows: normalized at 1650 deg. F., quenched in water from 1625 deg. F., tempered at 600 deg., 800 deg., 1000 deg., and 1200 deg. F. Size as treated: 3/4 in. for tensile specimens, and 9/16 for impact specimens.

o o o

ABOVE

FIG. 2—Core properties of carburized steels. Base analysis: 0.20 C, 1.00 Cr. Heat treatment: normalized at 1650 deg. F., pseudo-carburized at 1700 deg. F., further treatment as indicated. Size as treated: 3/4 in. round for tensile specimens, 9/16 in. square for impact specimens.

ployed because these low-carbon steels may be used in the carburized as well as the normalized or heat treated condition.

The essence of the grain size study is shown in Table I which gives the coarsening temperatures of the steels as determined by both methods. All the steels were fine-grained (A.S.T.M. 6-8) below their respective coarsening temperatures. The addition of aluminum, titanium or vanadium (either singly or in combination) to the straight-chromium steel markedly raised the coarsening temperature. However, aluminum and titanium were appreciably more effective in this respect than the vanadium. The aluminum- and titanium-treated steels coarsened abruptly on being heated above their coarsening temperatures, but the straight chromium steel A and the chromium-vanadium steel F coarsened gradually. No abnormal structures were found in any of the carburized steels.

[2] In this article, the term strength is used in a generic sense to include both yield and tensile strengths.

[3] The only exception to this rule was the low reduction in area of steel G after the 1650 deg. treatment. However, this value was not considered truly representative because it was obviously out-of-line with the reduction in area values obtained after normalizing the same steel at the higher temperatures.

Properties of Normalized Steels

Table II shows the properties of the steels after normalizing for 1 hr. at 1650 deg., 1850 deg. and 2050 deg. F. With the raising of the normalizing temperature, the straight chromium steel A exhibited a marked increase in strength[2] and a corresponding decrease in ductility and in impact resistance. This indicated that steel A was quite susceptible to air-hardening. The deoxidation of this steel with aluminum, as in the case of steel A-1, produced a decrease in strength, an increase in ductility and impact resistance, and a decrease in air-hardening tendencies.

The addition of titanium to the chromium steel had the same general effect as the aluminum, except after the 2050 deg. F. treatment. The higher titanium steels D and E (containing about 0.10 per cent and 0.25 per cent titanium respectively) were quite resistant to air-hardening up to 1850 deg. F., particularly as indicated by their high ductility and impact resistance; but, unlike the aluminum-treated steel A-1, they underwent a sharp increase in strength and decrease in impact resistance after normalizing at 2050 deg. F. Although the coarsening temperatures of steels D and E in the uncarburized condition were below 2050 deg. F., this was also true of steel A-1. Hence, the marked air-hardening of these two titanium steels after the 2050 deg. treatment could not be attributed to enlarged grain size. More likely, some of the titanium carbide or cyanonitride particles in the higher titanium steels dissolved in the austenite at this high temperature, and thereby greatly increased the hardenability. Excellent ductility was obtained in steel C-1 with the combined use of aluminum and titanium.

In general, for the normalizing treatments used the vanadium-bearing steels possessed greater strength and lower ductility than all the other treated steels. The chromium-vanadium steel F was the most susceptible to air-hardening; even normalizing at 1850 deg. produced a striking increase in strength and decrease in impact resistance as compared to the normalizing at 1650 deg. F. On the other hand, the addition of either aluminum or titanium with the vanadium, as in steels F-1 and G, inhibited the air-hardening after the 1850 deg. treatment. Amongst the three vanadium-bearing steels, steel F generally exhibited greatest strength with lowest ductility and impact resistance; steel F-1 showed just the reverse; and steel G had intermediate properties.[3] In other words, despite its low vanadium-content, steel G displayed an excellent balance of strength, ductility and toughness in the normalized condition.

Quenched and Tempered Steels

Fig. 1 illustrates the properties of the steels after water quenching from 1625 deg. F. and tempering at 600 deg., 800 deg., 1000 deg. and 1200 deg. F. Except for the vanadium-bearing steels when tempered at 1200 deg. F., the straight-chromium steel A had higher strength and lower ductility and impact resistance than all the other steels. Deoxidation with aluminum (steel A-1) produced a marked improvement in the ductility and impact values, but only at the expense of a large decrease in strength.

Table I

Special Alloy Content and Coarsening Temperatures of Steels Investigated (Normal base analysis; 0.20 C, 1.00 Cr, 0.45 Mn, and 0.25 Si)

Steel No.	Special Alloy Added to Heat, Per Cent	Analysis, Per Cent Ti	Analysis, Per Cent V	Remarks	Coarsening Temperature, Deg. F. Ferrite Method	Coarsening Temperature, Deg. F. Cementite Method
A	None	—	—	Straight chromium steel	1675	1675
A-1	None	—	—	Deoxidized with addition of 0.05 per cent Al	1900	1950
B	0.05 Ti	0.025	—	—	1830	1830
C	0.10 Ti	0.038	—	—	1950	1950
C-1	0.10 Ti	0.049	—	Deoxidized with addition of 0.05 per cent Al	1900	1950
D	0.25 Ti	0.101	—	—	1950	2000
E	0.50 Ti	0.248	—	—	1950	2050
F	0.18 V	—	0.16	—	1850	1850
F-1	0.18 V	—	0.15	Deoxidized with addition of 0.10 per cent Al	1950	2050
G	0.10 V+0.10 Ti	0.028	0.09	—	1850	1950

The addition of titanium to the base analysis also lowered the strength and raised the ductility and impact resistance. These effects increased in proportion to the titanium content, and a wide range of properties was developed. For example, steel D containing approximately 0.10 per cent titanium had about the same ductility and impact resistance as the aluminum-deoxidized steel A-1, yet had higher strength. Similarly, steel E with approximately 0.25 per cent titanium had about the same strength as steel A-1, but was more ductile and resistant to impact. In the comparison of steels C-1 and A-1, it was evident that the addition of titanium to the aluminum-deoxidized steel improved both the strength and the ductility, but lowered the impact resistance. The aluminum-deoxidized steel C-1, containing about 0.05 per cent titanium, had very similar properties to steel D which contained twice as much titanium.

The vanadium steels as a group displayed greater retention of strength after tempering than any of the other steels. Among the vanadium-bearing steels, steel G had the best combination of properties. In general, the strength, ductility and impact resistance were substantially equal to, or better than, the corresponding properties of the higher vanadium steels F and F-1. It may also be noted that steels F and F-1 had considerably lower ductility and impact values than those reported for S.A.E. 6120 steel.[4] This fact suggests that the experimental compositions investigated may be expected to show greater ductility and toughness when made in large scale heats.

[4] "Vanadium Steels and Irons," Vanadium Corp. of America, New York, p. 28.

[5] This medium is not recommended for pseudo-carburizing purposes because it was found that some carburization takes place, and machining after heat treatment becomes difficult.

Pseudo-Carburized Steels

Suitable lengths of normalized bars (¾-in. round for the tensile tests and 9/16-in. square for the impact tests) were pseudo-carburized in cast iron chips[5] for 8 hr. at 1700 deg. F., and were then given the following treatments:

Treatment K: Box cooled from carburizing temperature. Oil quenched from 1625 deg. F. Water quenched from 1450 deg. F. Air cooled from 375 deg. F.

Treatment L: Oil quenched from the carburizing temperature. Water quenched from 1450 deg. F. Air cooled from 375 deg. F.

Treatment M: Box cooled from carburizing temperature. Water quenched from 1525 deg. F. Air cooled from 375 deg. F.

Treatment P: Box cooled from carburizing temperature. Oil quenched from 1625 deg. F. Air cooled from 375 deg. F.

Treatment N: Oil quenched from the carburizing temperature. Air cooled from 375 deg. F.

The properties of the test specimens machined from the bars after the above heat treatments are shown in Fig. 2. As a general rule, the best combinations of properties were produced by treatments M, P

Table II

MECHANICAL PROPERTIES OF NORMALIZED STEELS

Steel No.	Ti Content	V Content	Normalizing Temperature, Deg. F.	Yield Strength, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation, Per Cent	Reduction in Area, Per Cent	Izod Impact, Ft.-Lb.
			1650	55,000	85,500	26.0	58.0	47.0
A	—	—	1850	58,200	97,000	20.0	53.5	12.0
			2050	68,500	111,000	14.0	47.0	2.5
			1650	48,400	78,500	30.4	63.0	81.0
A-1*	—	—	1850	51,000	87,700	27.2	61.5	60.0
			2050	52,500	90,000	24.8	53.2	25.0
			1650	58,500	80,300	31.2	58.8	65.0
B	0.025	—	1850	55,000	81,900	28.0	61.0	29.0
			2050	60,300	97,800	22.4	55.2	9.5
			1650	51,700	78,000	32.0	64.2	74.0
C	0.038	—	1850	57,400	93,100	23.5	62.5	13.0
			2050	67,200	102,000	22.4	53.2	13.5
			1650	52,000	81,700	32.8	68.0	74.0
C-1*	0.049	—	1850	52,700	79,200	32.9	65.1	47.0
			2050	50,200	87,700	27.2	63.9	7.0
			1650	48,800	76,600	32.0	66.2	70.0
D	0.101	—	1850	53,000	78,600	32.0	64.1	51.0
			2050	61,500	98,800	28.0	60.5	4.0
			1650	46,800	78,000	32.0	68.5	73.5
E	0.248	—	1850	60,000	83,000	32.8	70.5	62.5
			2050	75,500	111,000	20.8	54.8	6.5
			1650	62,400	84,700	28.8	60.0	58.0
F	—	0.16	1850	80,000	108,500	20.8	55.2	15.0
			2050	82,800	115,000	17.6	46.4	2.5
			1650	56,200	81,000	32.8	65.6	71.5
F-1**	—	0.15	1850	56,600	84,300	27.2	63.1	68.5
			2050	70,800	106,000	21.6	58.3	11.0
			1650	61,100	85,600	28.0	56.1	70.5
G	0.028	0.09	1850	65,700	87,800	27.2	57.8	47.5
			2050	75,800	112,000	20.0	56.4	3.0

* Deoxidized with addition of 0.05 per cent Al.
** Deoxidized with addition of 0.10 per cent Al.

and N, each of which involved only a single quench. Among these three treatments, M resulted in the highest strength and P in the lowest strength, but the latter was counterbalanced by excellent ductility and impact resistance. Notwithstanding the high strength produced by treatment M, the ductility was good and the impact resistance fair. Treatment N which involved a direct oil quench from the carburizing temperature usually developed properties intermediate between those produced by treatments M and P. Treatments K and L which included double quenching caused good tensile strength but the yield points were disproportionately low. Furthermore, the accompanying ductility and impact values were slightly inferior, on the average, to the corresponding values developed by treatment M; yet the latter treatment produced the highest tensile and yield strengths of all the treatments.

In agreement with the previous results, the straight-chromium steel showed the highest strength, but rather low ductility and impact resistance. Deoxidation of this steel with aluminum markedly lowered the strength after all treatments, but improved the ductility only after treatment N and improved the toughness only after treatments P and N.

The addition of titanium to the straight-chromium steel had the usual effect of lowering the strength and raising the ductility and impact resistance, with the highest titanium contents producing the greatest effects. As in the case of the quenched and tempered treatments, the aluminum-deoxidized steel C-1 containing about 0.05 per cent titanium had very similar properties to steel D which contained twice as much titanium. Steel E with about 0.25 per cent titanium exhibited particularly high ductility and impact resistance except after treatments M and N where the impact values were not any higher than those of the lower titanium steels. This exception was accounted for by the fact that a metallographic examination of the steel E impact specimens used for treatments M and N disclosed considerable segregation of titanium cyanonitride.

Among the vanadium-bearing steels, steel F containing 0.16 per cent vanadium seemed to have the best combination of properties; yet the superiority over the lower vanadium steel G was relatively slight.

Conclusions

(1) The addition of aluminum, titanium or vanadium to a 1 per cent chromium steel containing 0.20 per cent carbon raises the coarsening temperature. The effectiveness of these elements in this respect decreases in the order named.

(2) The addition of titanium to the above low-carbon 1 per cent chromium steel lowers the strength properties and raises the ductility and impact properties. In this respect, the titanium behaves more like aluminum than vanadium. However, the titanium produces a better combination of properties than is obtained by aluminum deoxidation alone. Hence, the effect of the titanium is not simply one of deoxidation and grain refinement. The titanium has specific alloying action.

(3) Aluminum and titanium inhibit air-hardening in these steels after normalizing at temperatures up to 1850 deg. F. However, after normalizing at 2050 deg. F., the air-hardenability of the titanium-bearing steels increases markedly, probably due to the solution of the titanium carbides or cyanonitrides. Vanadium, in the absence of aluminum or titanium, raises the air-hardenability after normalizing at 1850 deg. F. or above.

(4) In the pseudo-carburized and heat treated steels, as well as in the quenched and tempered steels, titanium contents between 0.025 and 0.25 per cent produce a wide range of mechanical properties. The lower titanium steels exhibit high strength with moderate ductility and impact resistance, while the higher titanium steels exhibit moderate strength with high ductility and impact resistance.

(5) The combined use of aluminum and titanium may be advantageous in attaining a given set of properties with less titanium than would be required in the absence of aluminum.

(6) The hardened vanadium-bearing steels show greater ability to retain their strength after tempering than the non-vanadium steels. This property is not impaired by the reduction of the vanadium content from 0.16 to 0.09 per cent and its replacement with about 0.03 per cent titanium. With this substitution of titanium for part of the vanadium, an excellent balance of properties may be obtained.

Acknowledgments

The authors wish to acknowledge the effective cooperation of the Titanium Alloy Mfg. Co. in carrying out this work. Special credit is due to A. F. Wolf for the making of the steels and to G. F. Comstock for many helpful suggestions.

Physical Properties of Magnesium Alloy S.A.E. No. 50

IN the article "Magnesium Sand Castings," by N. M. Briskin, of Ford Motor Co., in THE IRON AGE, July 10, a table on page 48 listed the physical properties of magnesium alloy S.A.E. No. 50. This table was in error, and should have appeared as follows:

	Tensile Strength, Lb. Per Sq. In.	Yield Strength, Lb. Per Sq. In.	Elongation in 2 In., Per Cent	Brinell Hardness
As cast	27,000	12,000	5	50
Heat treated	36,000	16,000	9	58
Heat treated and aged	40,000	20,000	1	65

In the incorrect table the terms "Heat Treated," and "Heat Treated and Aged" were interchanged, and the second value for Brinell hardness listed was shown as 62 instead of 58. This former value is slightly higher than is ordinarily obtained with the solution treatment only. As mentioned elsewhere in the article, the aging, or precipitation treatment gives *more* strength and hardness at a sacrifice in ductility.

Die Typing to Speed Production

By W. F. SHERMAN
Detroit Editor, The Iron Age

—With "speed, more speed" the cry of the day, this method of producing duplicate dies for forging, sheet metal work, plastic molding, die castings, etc., is of particular importance. Also notable are the increases in die life and savings in expensive die steels.

FOR more than a decade there has been in use at Ford Motor Co. a method for rapid duplication of most kinds of dies and molds which in some cases has saved up to 90 per cent of the time ordinarily employed in making dies. Because large volume production—in some cases requiring many hundreds of sets of duplicate dies yearly—has been associated up to now only with the automobile industry, little attention seemingly has been focused on this important process. Industry, by and large, forgot what it may have heard about the process, perhaps because it could see little chance to apply it widely.

The defense program has, among other things, widened the interest of general industry in problems of tooling for mass production. It has so expanded the output of many plants that they are—frequently for the first time—in need of tooling up on such a large scale that they, too, will need many duplicate sets of dies to fulfill contracts.

This change in the status of many industrial plants has been an important factor in reviving an interest in the Ford die manufacturing technique. First described nearly 10 years ago (THE IRON AGE, March 17, 1932), it is a forging process of die making, commonly called "die typing."

Essentially, the die typing process starts with a slightly oversize "cut" die which is used to forge blocks of die steel which in turn are used for the forging of sets of production dies. The process is one calling for great accuracy and a perfection of surface finish at each stage. It eliminates machine work on the production die impressions.

Twelve or 13 years ago, engineers began experimenting with this typing method of duplicating dies. Since that time more than 200 different automotive parts, many of them difficult forgings, have been produced from such typed dies. The dies have been employed also for a variety of trimming, forming and molding operations.

The first advantage attached to the use of typed dies is the spectacular reduction in time required to produce a finished set of dies. Second, it has been demonstrated that the forged die structure has greatly improved life, attributable to the hot working of the die material during the forging or typing operation on the die. Productivity of die sets was found to be increased about twice over that usually recorded. Accuracy of production parts produced in these dies was obtainable within very close limits. Third, the dies have been produced as small inserts in larger die retaining blocks—an obvious economy since inserts can be changed repeatedly without great loss of die material.

Comparison with Die Sinking

Conventional die sinking is laborious and costly, requiring that considerable skilled work be done by hand, even where most advanced die-sinking techniques are employed. More recently the use of automatic engraving machines or form millers, which machine die blocks to their approximate working shape by transferring contours from a three-dimensional model to the die block, has speeded up die sinking, but even these dies must be finished by portable power tools and by hand to remove cutter marks and in general to work the impressions to the final size and finish desired.

Die typing can never replace die

sinking since, as will be seen, the original, master impression must be cut out of solid metal. Where die typing has been proved economical is in cases where more than about 10 sets of duplicate dies are ordered at a time. Duplicates are required where production rates are high enough to make it necessary to have several sets of dies in operation at one time; where spares are required as an insurance against down time; to replace worn out dies; and to tool up auxiliary plants and sub-contract operators.

Early Automotive Practice

Ten to 15 years ago some automobile plants performed an operation

FIG. 1—For an object such as this, the die typing process starts with a master-master die.

that resembled both die hubbing and die typing in some respects. During this period, when required service parts were no longer in stock, it was the practice in some forge shops to take a sample of the required part (a steering ball arm, for instance) and press it into a heated block of steel, thus forming the crudely shaped die cavity. This cavity was finished by hand and then was used to forge the required service parts, the usual production being 100 to 300 parts from this type of die.

Analogous to Hubbing Process

As a starting point in the description of die typing, it may be compared to die hubbing (sometimes called die hobbing) which it resembles superficially, although there are important differences in the technique and the results. The chief difference is that die hubbing is done cold, while die typing is done hot, different types of die steel being used for each process.

Die hubbing is employed in making dies for plastic moldings, for jewelry embossing, for dies used in die casting, etc. This is accomplished by making a hardened steel model of the object for which the die or mold is intended. This model is impressed under a pressure of approximately 200 tons per sq. in. until it is forced half way into a very soft block of steel or ingot iron at room temperature. The process is most applicable in cases where a symmetrical object is involved, since the model can be turned on a lathe, for example.

Until recently, dies made by the hubbing process were formed in non-hardening material, so their uses are somewhat restricted accordingly, but there are now three types of carburizing steels for hubbed molds available. The hubbing process, however, is impracticable for making dies that will be involved in severe usage, such as forgings. In die typing, the impression is formed while the die block is hot, so that through-hardening steels can be used as in ordinary forging die practice.

Die-Typing Procedure

In the decade during which the die typing process has been in use, a standard shop procedure has been developed and, along with it, some terminology new to the die-making industry has also been developed. For clarity the process will be described with reference to a simple object (Fig. 1) although the object might as well be a connecting rod,

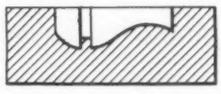


FIG. 2—Vertical cross-sectional view through the machined die prepared as a master-master.

camshaft, automobile steering spindle, or any shape ordinarily forged or molded. New terminology, when introduced, will be explained. It is understood that even though description may be limited to a single die block, it applies to pairs of similar or dissimilar blocks, whichever are required.

It is obvious that a part such as that illustrated in Fig. 1 would be forged from a die cut as an intaglio. If this die, in turn, is to be made by a forging process, the master die must be embossed, or in cameo relief. Because cutting a cameo-like die is exceptionally expensive and time-consuming, the die typing process makes use of a master-master die in an instance like this, so it can produce the embossed die by forging from an intaglio die. This, if it sounds confusing, will be explained as the process is unfolded in the following text.

For the object pictured in Fig. 1, the die typing process starts with a master-master die (sometimes referred to as the female master). This is used to forge a number of embossed master dies (sometimes referred to as male master dies). These are sometimes also referred to as the typing dies, since it is from them that the required number of sets of production dies are typed or forged.

As in usual die practice, it is necessary to incorporate draft angles in the die design and allowance must be made for shrinkage. *However, allowance for triple shrinkage must be made in the master-master die for die typing* for all the hot metal work (forgings, etc.), one shrink being anticipated when the master typing die is forged from the master-master, another when the production die is forged, and the final shrink when the production part is forged. In any event, at least double shrinkage is necessary, with the first shrink eliminated when the dies are to be used for cold forming. Aside from the requirement of triple shrinkage, and the occasional necessity of venting a die by drilling small holes to permit the escape of gases during the forging process, die design appears to present no special problem in the shop employing the typing process.

The master-master die is cut according to conventional practice but the die *block* is only moderately larger than the die impression to be made in it, since all the dies are made up as inserts to be held in a retainer block. Besides greatly facilitating the typing process, this is an advantage because it elim-

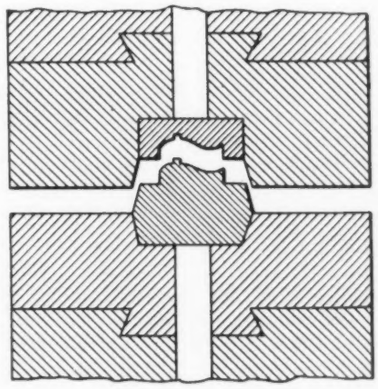


FIG. 3—The typed die and the master-master die are shown here as inserts in retaining blocks.

inates the usual practice of handling very large heavy die blocks, even for small jobs, and also reduces the amount of die metal in circulation in the shop. The scrapping of die material is greatly reduced by this practice, also.

Fig. 2 is a vertical sectional view through the machined die prepared as a master-master in accordance with this process.

The die typing process makes use of an insert retaining block to provide the mass usually associated with a forging die and also to provide a means of attaching to the power press or hammer. Such an insert retaining block is used in the typing process, itself, and in the production of parts made from the typed die.

Forging or Typing the Die

The first step in the die typing process is illustrated in Fig. 3 which represents diagrammatically a section through the die blocks of a power press or hammer, showing the master-master die illustrated in Fig. 2 supported in the upper die member and illustrating a male die, or master die, as having been

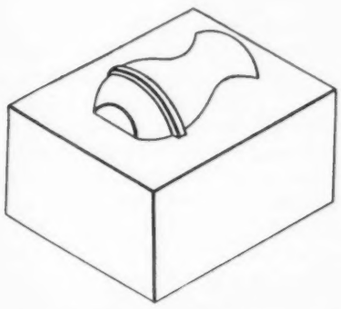


FIG. 4—The typed die produced in the initial step will have the form shown here.

formed by typing. The typed die, and the master-master die, are shown as inserts in retaining blocks which are in turn mounted in the press head and bed in a conventional manner.

In the view shown, the master-master die was shrunk into its retaining block before the forging operation began; the typed master die was at first only a squared up billet of steel, but in the forging operation it has been expanded to fill the recess in its retainer block. Upon cooling it can easily be forced out with the knock-out pin acting through the hole shown in the sketch. When it is necessary to remove the master-master die from its retaining block, it is easily driven out with the knock-out pin after the retaining block has been heated to approximately 850 deg. F. and the insert cooled by means of a water spray.

The typed die produced in this initial step will have the form shown in Fig. 4. (It is only necessary to square up the die insert after removal from the retaining

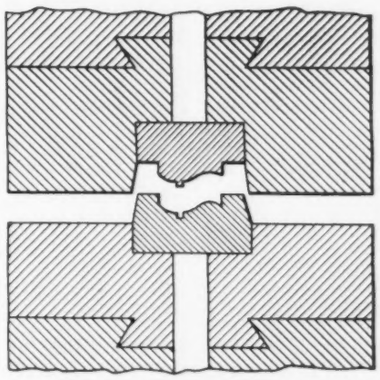


FIG. 5—This is the manner in which the male die, or type, is employed for forming the die insert block to be employed for productive purposes.

block—*the die surface required no machining.*)

Fig. 5 illustrates the manner in which the male die, or type, is employed for forming the die insert block to be employed for productive purposes. Fig. 6 shows a set of finished die blocks, inserted in retainer block, mounted in the press or hammer, and ready for production of the part illustrated in Fig. 1.

Use of Retainer Blocks

The insert retaining block shown in Figs. 3 and 5 is of rectangular cross-section and is provided with parallel side walls in the upper portion. The side walls of the lower portion of the recess are tapered slightly outward to provide the draft conventionally employed in connection with forging or other corresponding dies. The depth of the upper portion corresponds substantially with the depth of the master-master die.

The draft shown in the recess in the lower retainer block is not absolutely essential since the cooling of the heated metal will free the die insert, anyhow.

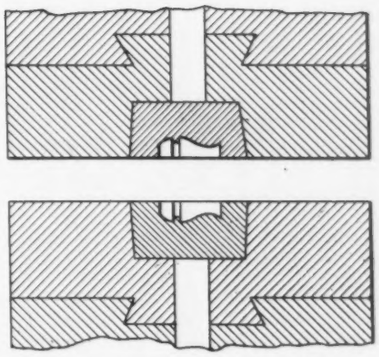


FIG. 6—This set of finished die blocks is ready for production of part shown in Fig. 1.

In the forming of these dies, only sufficient hot metal is placed in the depression in the lower retainer block to insure complete filling of the depression and complete formation of the die itself.

The flash, as shown in Fig. 5, is below the actual die impression and the metal forming it is flowed directly from the main body of the hot billet so there is no tendency to deform the working face of the die. If the flash were formed in the plane of the upper, or working face, of the die, the metal forming the flash would flow transversely outward from the cavity into the flash and there would be a tendency for the flowing metal to pull away from the type at the upper edge of the cavity.

"Retaining Wall" Effect

Also important to the success of the die typing process is the fact that the insert on the hammer is mounted deep in its recess. Then the side walls of the recess provide a retainer ring or wall so the heated billet, in its forming stages, is laterally supported. This prevents uncontrolled flow of metal and results in the true forging or typing action that is required.

Finishing the Production Die

The production die insert, after being removed from the typing block, is machined on the side and bottom faces and usually no other machine work is required. The side faces may be machined square with the top face (as in the case of the master-master die and the type block) and be retained in the retainer block by merely a shrink fit, or the sides may be slightly tapered inward toward the bottom, about $\frac{5}{8}$ in. taper per ft. Inserts driven into

[CONTINUED ON PAGE 96]

Metallographic Examinatio

—Continuing last week's description of a method devised in Germany to reduce all the relevant metallographic information about steel to a series of numbers. Herein, in conclusion, data are given on classifying inclusions, carbide segregation, other structural phenomena, and surface condition.

o o o

SEVEN series of SMS were evolved bearing on inclusions, with value numbers indicated for size and frequency: 1.01.0 is the series for the estimation of sulphide inclusions, and these bluish-gray islands (see also Fig. 1) are given value numbers from 1 to 6, from the smallest and most infrequent to the largest and most frequent. These inclusions occur in steels from acid and basic open and electric furnaces: 1.02.0 defines brittle oxide slag inclusions, mostly Al_2O_3. They occur in rolled or forged billets usually distinct from one another, in single spots or lines. Acid open hearth steels have mostly smaller inclusions, while basic open hearth steels in which they occur more rarely, carry isolated and larger inclusions in a clean ground mass. They do not occur in other grades of steel.

Basic electric steels require a greater number of SMS designations: that is, 1.03.0 for coherent oxide slags in ball shape (see Fig. 1 last week); 1.04.0 for coherent oxide slags in oval shape; 1.05.0 for coherent oxide slags in line shape; 1.06.0 for coherent oxide slags in double lines in streaks; and 1.07.0 for coherent oxide slags in multipoint patterns.

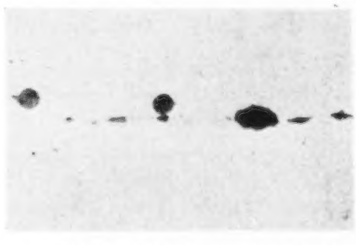
The value number or the significant number was determined by the area of inclusions. A volume determination would, of course, be more accurate but the system herein is meant for service conditions and should not carry beyond. It seems worth noting that these inclusion forms rarely occur together in the same steel; for, of the many inclusions a few are typical for each works, betraying individuality in the production processes. This, however, offers a possibility of estimating origin and quality of a steel by the analysis of a sufficient number of specimen.

The steels made in the basic open hearth showed SMS 1.01.0, sulphide series, varying in size and frequency. Dark oxide inclusions in a sulphide lens were found to be significant for duplex steel premelted in a basic furnace and finished acid. It may happen that in-

ABOVE

FIG. 2—Mixed slag inclusions occurring particularly in steel pre-melted in the basic open hearth and finished acid. Note that in the sulphide lens are included dark oxide inclusions. At 100 diameters; reproduced here about one-half size.

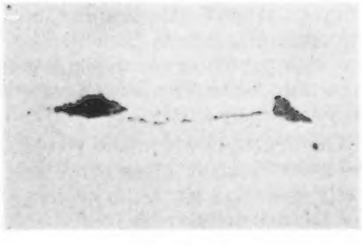
2 x between 1.05.5 and 1.05.6



1 x 1.03.1; 4 x 1.03.2; 2 x 1.03.4; 1 x 1.03.5

RIGHT

FIG. 3—Special cases of nonmetallic inclusions in basic steels. At 100 diameters; reproduced about one-half size.



1.03.6 + 1.03.4

1.05.6 + 1.03.5

...tion Standardized

Translated by
C. M. COSMAN
The Iron Age, New York

clusions are encountered which individually would belong in separate classes. Here the SMS figure is found by adding together the values (Figs. 2 and 3), as in 1.03.2 + 1.02.1 + 1.04.0. If there are varying inclusions within one class, then the SMS value will be found readily. However, it would be cumbersome to attempt to take care of all the combinations possible.

In steels from the high frequency furnace a particularly wide variety of inclusions have been observed even within one cast. Here, also, the method of manufacture seems more important than with the other methods. Figs. 4 and 5 show SMS for Cr-Ni and Cr-Mo steels, mostly within 1.06.0; the conclusion that they were made in the acid open hearth seems justified.

The SMS 1.11.0 to 1.14.0 (see Fig. 6) refer to the segregations and inclusions in free cutting steels. Since these steels must contain a large number of inclusions, SMS have been developed to apply to this class. With these series a uniform and concise evaluation of segregational inclusions in free cutting steels has been made possible for the plant. While measuring processes are neither mathematically nor physically exact, it is possible to give speedy information for practical purposes regarding the nonmetallics in the steel.

The procedure adopted for the evaluation was found to be this: a note is made of the highest value number found in the polished section (Fig. 7) and this adopted as the standard. If, however, there are island inclusions, then their number is important for the quality of the steel and the frequency should be shown by prefixing a 2 x or 3 x—for instance, 3 x 1.05.4, etc. While sulphide and carbide segregations can only be described as such by SMS, for oxides the shape and line picture is also defined. It has been found desirable to show the position of the test piece within the steel.

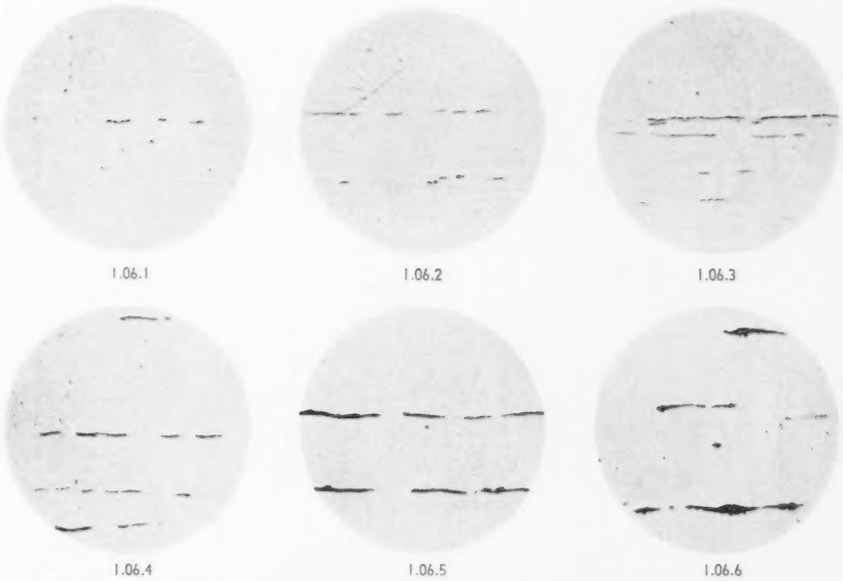


FIG. 4—Standard metallographic series for slag inclusions in Cr-Ni steel. This corresponds to 1.06.0 in Fig. 1. At 100 diameters; reproduced about one-half size.

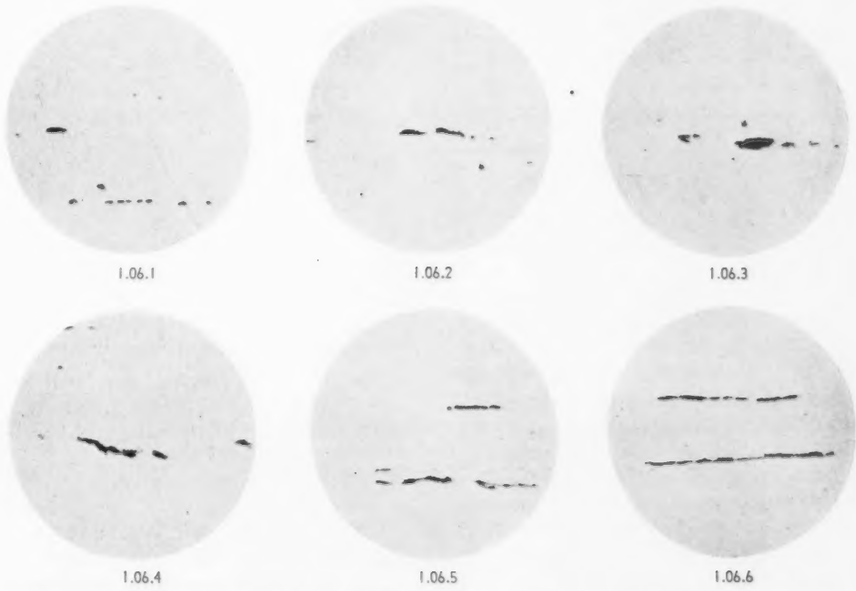


FIG. 5—Standard metallographic series for slag inclusions in Cr-Mo steel. This corresponds mainly to 1.06.0 in Fig. 1. At 100 diameters; shown here one-half size.

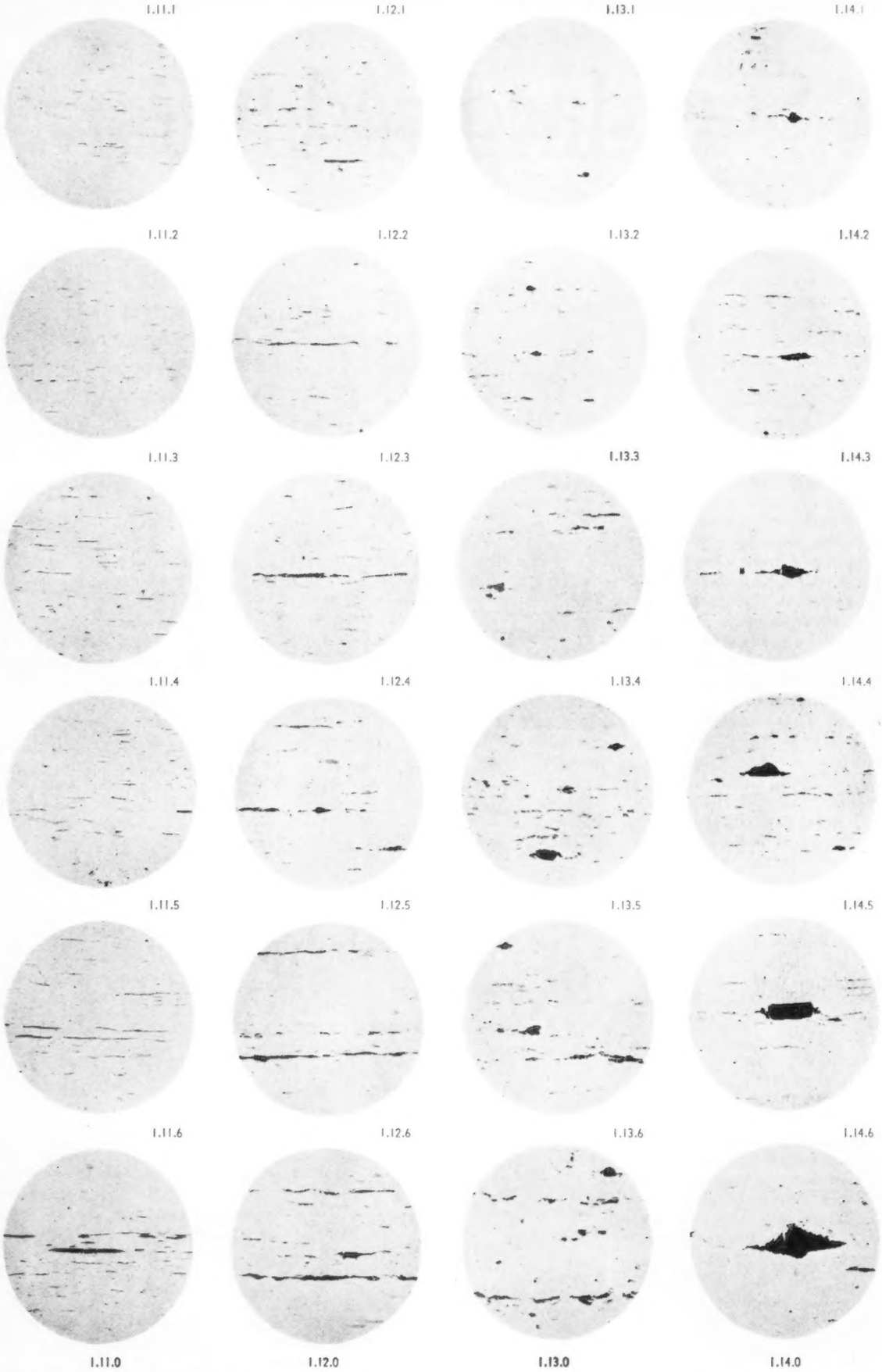


Fig. 6—Standard metallographic series for slag inclusions in free cutting steels. At 100 diameters; shown here one-half size

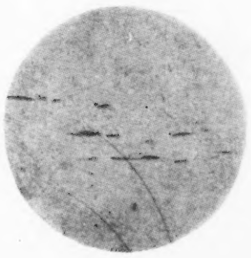
If a specimen comes from the surface, an S is prefixed; intermediary and center zones are shown by I and C. Every sectional area yields 10 test pieces at least, and value numbers of the cuts are noted—the sum gives quality and value. Divergence of the values is greater with oxide than with sulphide or carbide segregations. Averages obtained by different observers or at different points agree well. Greater series are evaluated by finding a mean value for carbide, sulphide and oxide segregations, first singly and then taking the total.

Development of these series led to a clear picture, distinguishing both source and process of steel smelting by showing the typical picture of inclusion size and shape for each plant. However, it must be repeated that the total picture is significant in a large measure for each type of furnace and no one inclusion type defines the furnace, since they all occur in all furnaces with varying frequency and size. Certain points have clearly emerged, however: A steel showing 1.01.2 to 1.01.4 without line or ball shaped oxide inclusion is usually acid open hearth steel. A steel with 1.01.05 to at the most 1.01.15 with line and ball shaped oxide should be basic electric steel. Acid steels are distinguished by the large number of evenly distributed smaller S and O-ide inclusions of series 01.0 and 02.0, as shown in Fig. 1 (last week). Basic steels, especially those from the electric furnace, show few large oxide inclusions in a variety of shapes, overwhelmingly in the series 1.03.0 and 1.05.0—these are found only after a prolonged search. All these facts can be of use when it is a question of separating steels that have been mixed up by delivery or in the plant, without resorting to chemical analysis.

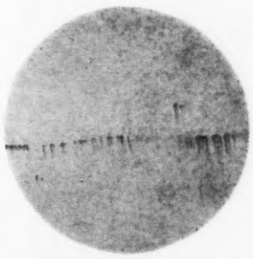
The inclusion size depends on the degree of deformation, but billets and slabs of 20 to 120-mm. diameter or square show no marked divergence in values. Material dimensions can be accounted for by relative evaluation. Clearly, for the same purpose of a certain part the inclusions may be greater or smaller relative to their size.

Carbide segregations, SMS 2.00.0 are caused by the concentration of cementite at certain points. In this series 0.5 is used as a value number since very pure steels exist and 4 already designates strong segregation. SMS 2.07.0 represents a C-segregation series in high carbon tool steel (12 Cr, 1.8 C). A low degree of deformation results in coarse concentrated double carbides, value number 3; while number 1 shows a good distribution, that is steel with toughness and good cutting properties. According to works requirements the material control post should apply SMS to establish usefulness or otherwise of the material. The hardening and treating of high speed tool steel (5 Co, 18 W), will be discussed later under SMS 4.00.0.

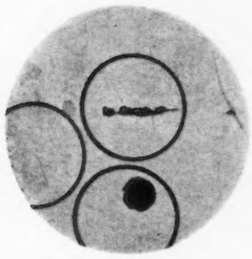
The SMS 3.00.0 is designed to show line structure measurement in high grade Cr-Ni and Cr-Mo steels for exacting service. Primary and secondary line structures occur, first after solidification and then after secondary crystallization in the solid state. Origin and influence of these line structures are well known. Since the line structure can be very detrimental, it is desirable to classify it according to



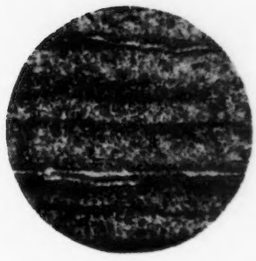
1.01.0



1.02.0



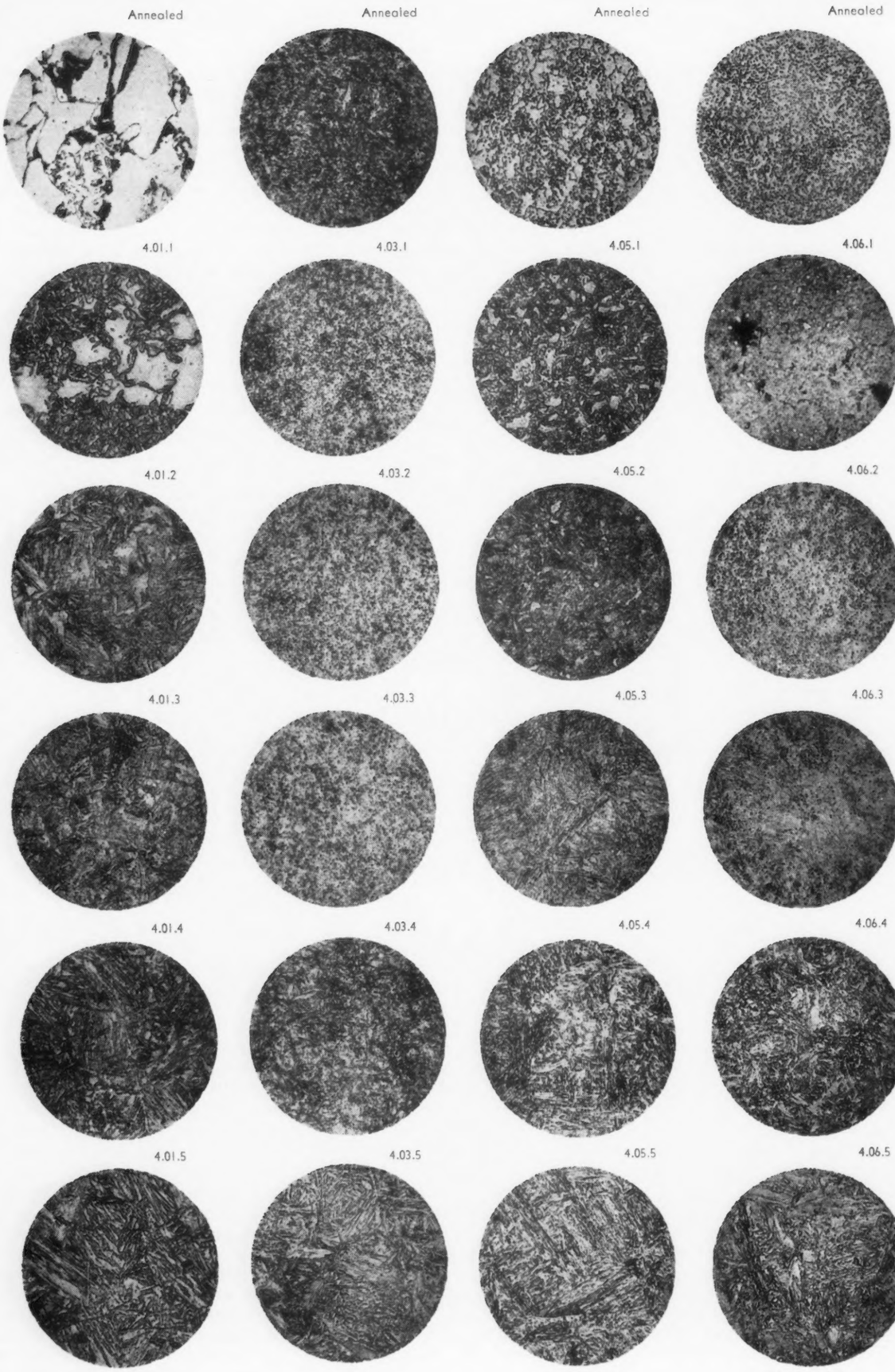
From 1.03.0 and 1.05.0

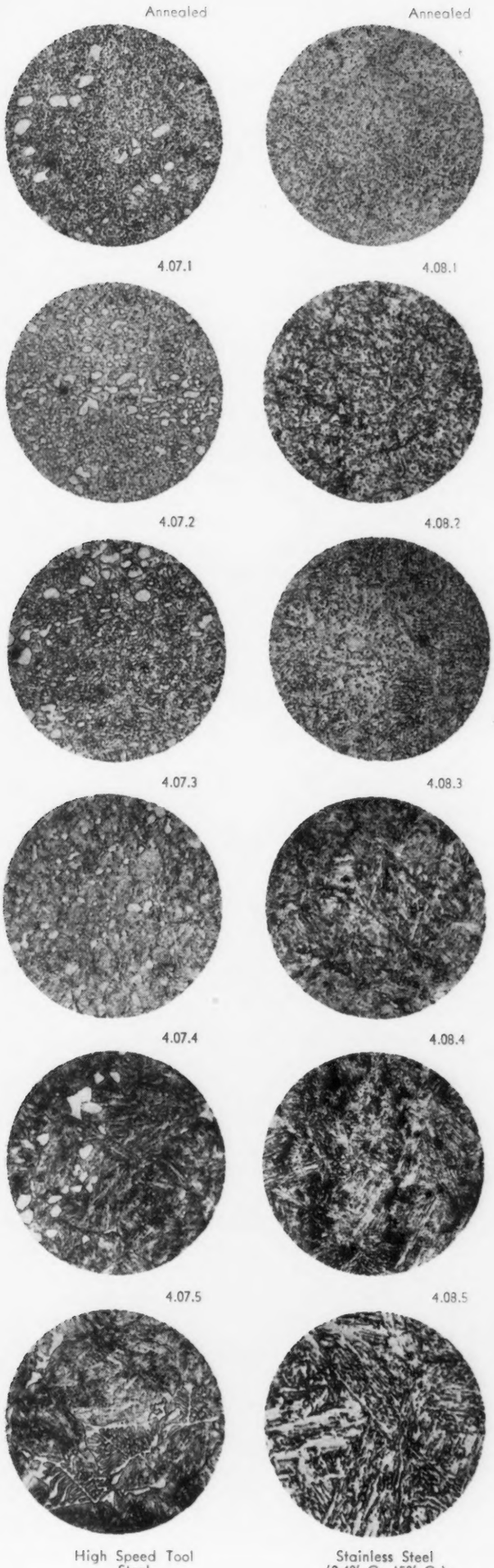


From 2.04.0

Vereinigte Kugellager-fabriken A.G.	Stahl Gefüge- und Schlackenuntersuchungen				Werk Schweinfurt Laboratorium
Probezettel Nr 8310	Lieferant: E			Abmessung: 36,3 ∅	
Lfd. Nr.	Schliff Nr.	Wertzahlen für I Sulfid-Schlacken	II Oxyd-Schlacken	III Karbid-seigerungen	Summe I+II+III	Bemerkungen z. B. Ti-Nitride, Zementitgitterwerk usw.
1.	6	0,5	2L	0,5	3	Th. 45915
2.	1	0,5	3K	0,5	4	
3.	10	0,5	3,5L	0,5	4,5	
4.	3	0,5	>4K	0,5	>5	
5.	7	0,5	2,5K	0,5	3,5	
6.	20	0,5	2K	0,5	3	
7.	14	0,5	1,5L	0,5	2,5	
8.	16	0,5	2L	0,5	3	
9.	12	0,5	3L	0,5	4	
10.	18	0,5	3,5K	0,5	4,5	
11.	5	0,5	2,5L	0,5	3,5	
12.	4	0,5	3K	0,5	4	
13.	13	0,5	4L	0,5	5	
14.	8	0,5	2K	0,5	3	
15.	9	0,5	0,5GL	0,5	1	
16.	15	0,5	1,5K	0,5	2,5	
17.	2	0,5	3L	0,5	4	
18.	17	0,5	2,5K	0,5	3,5	
19.	11	0,5	3,5L	0,5	4,5	
20.	19	0,5	2K	0,5	3	
21.						16.7.37.
22.						
23.						
Nr. 5281a ® 1. 40. 3.						DIN B 6.

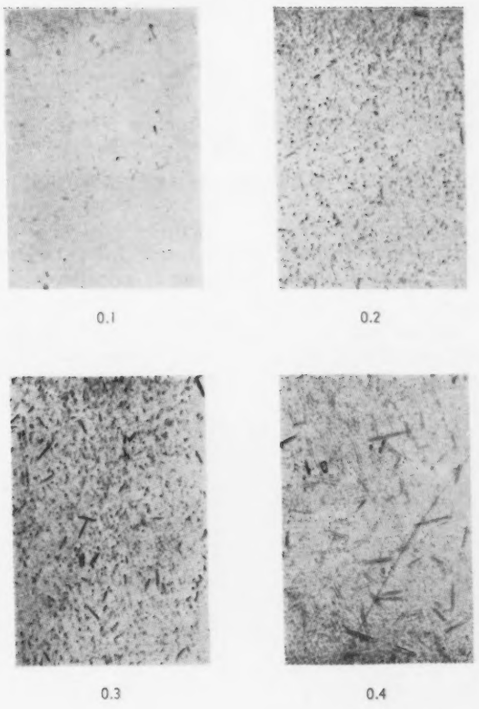
FIG. 7—Pattern of a structure, and slag investigation and its evaluation. First column gives current numbers, second gives number of section, and following are sulphide and oxide slag inclusions and carbide segregations. Sixth column is the sum of I, II and III, and finally there is space for special remarks, e.g., titanium nitrides, cementite lattice, etc. Also mentioned are source of steel and dimensions.


Annealed
Annealed
Annealed
Annealed
4.01.1
4.03.1
4.05.1
4.06.1
4.01.2
4.03.2
4.05.2
4.06.2
4.01.3
4.03.3
4.05.3
4.06.3
4.01.4
4.03.4
4.05.4
4.06.4
4.01.5
4.03.5
4.05.5
4.06.5
ECN 35
Structure at
center
4.01.0
ECN 35
Cast Structure
at about 1 mm.
case depth.
4.03.0
Spring Steel
(0.4% C; 0.8% Mn;
1% Cr)
4.05.0
Ball Bearing
Steel
(1% C; 1.5% Cr)
4.06.0



UPPER RIGHT

FIG. 9—SMS for surface of ball bearings. Value numbers 1 to 4. At 100 diameters; shown here two-thirds size.



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LEFT

FIG. 8—Standard metallographic series for hardened structure of structural and tool steels. SMS 4.02.0 and 4.04.0 were left out because they applied to steel of unknown analysis. ECN is a case hardening steel of 3.5 per cent Ni, 0.75 Cr and 0.15 C. At 1000 diameters; shown here one-half size.

an SMS series. Thus, tolerances can be established according to the purpose of the part. They should be established for each case, showing the influence of the line structure on the particular application.

Structural Phenomena

In the SMS 3.00.0 and 4.00.0 the ferritic and pearlitic structure of unalloyed steels and the influence of heat treatment and cold work on the grain size are discussed. Apart from carbide formation, grain size of these materials influences properties and appearance of the surface. Therefore, a standard series was evolved covering the whole practical range of grain sizes. After permissible limits have been defined, the SMS are quite satisfactory, efficient and time saving. Macrographic examination or technological testing may be in series also, e.g. the estimation of grain size by fracture examination, or the testing of cracks in rivet heads. But these tests must be complemented by microexamination. H. Styri and O. Walp (*Metal Progress*, vol. 20 (1931), p. 79) apply standard series to the examination of tool and structural steels of 1 per cent C, showing the structure of steels hardened but not tempered. The optimum range for both hardness and machinability lies between 170 and 200 Brinell, but this value does not define the steel sufficiently and microexamination is urged as a necessary complementary. The un-

[CONTINUED ON PAGE 96]

Paint Distribution Streamli

CIRCULATING systems now carry paint in many different colors to the half a hundred points of actual application to shelving, steel furniture, kitchen cabinets, lockers and other metal products as they come down the production lines of the plant of the Berger Mfg. Division, Republic Steel Corp., Canton, Ohio. The systems extend about two miles. Seven pipes are in one system and two in another.

Prior to installation of the new centralized paint mixing and circulating equipment, enamels and lacquers had been delivered in 50-gal. drums to four widely separated mixing stations located near the various finishing areas in the plant. There, as required, the finishing materials were prepared for use by reducing with thinners, stirring by hand with wooden paddles for 10 to 15 min. etc. Spray operators had to come to these decentralized sources of supply on an average of once every 2 hr. to refill the containers from which they sprayed.

Paint material mixed by hand in different locations, at different temperatures, at different times, and by not one but several individuals, could not be consistent in viscosity, specific gravity or degree of agitation—all of which have a direct bearing on the color uniformity to be obtained. Certain advantages to be derived from the centralized mixing of paints were, therefore, fairly obvious. Most important, continuous mechanical agitation could be used, a more complete dispersement of pigments obtained, and a homogeneous solution maintained at all times. Also, a more uniform temperature could be maintained in a mixing room than under any other conditions. Viscosity and specific gravity tests could always be made under the same conditions and would, therefore, be more directly comparable. The fire hazard could be materially reduced.

The DeVilbiss equipment consists of two centralized mixing and paint

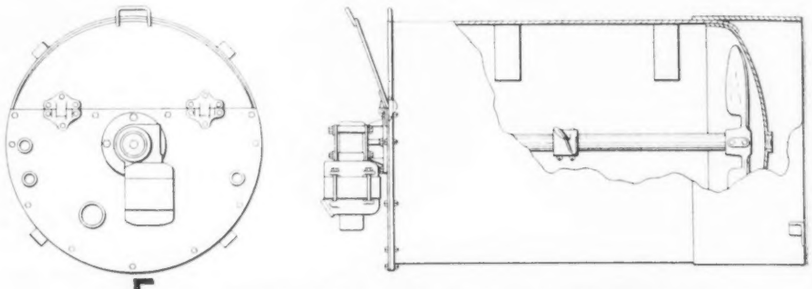

FIG. 1—Sketch of the mechanical paint mixing unit.

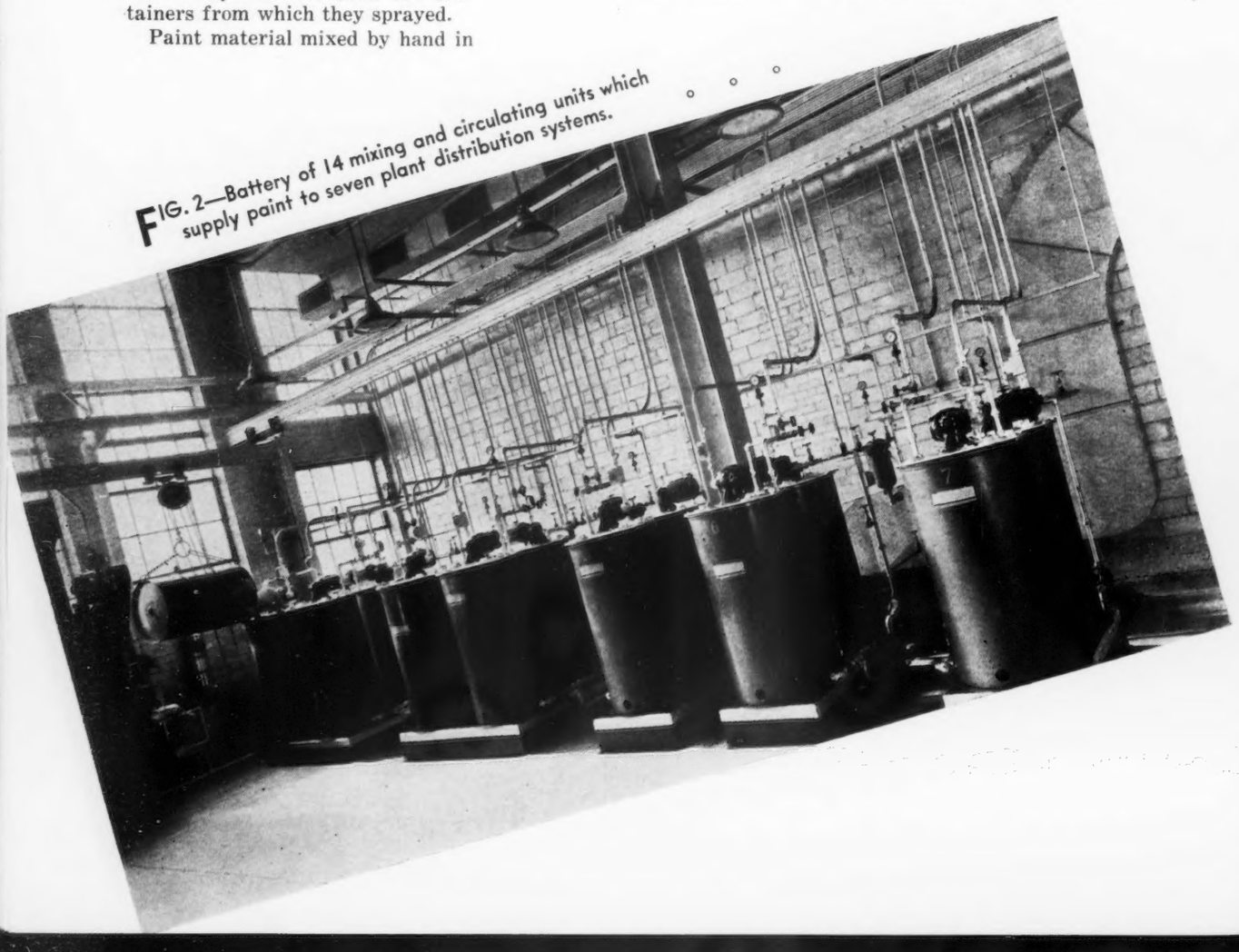

FIG. 2—Battery of 14 mixing and circulating units which supply paint to seven plant distribution systems.

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THIRTY-SIXTH in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

storage rooms from each of which circulating systems fan out to several points on two floors of the plant. In the larger of the two mixing rooms there are 20 mixing tanks, 14 of which serve a group of seven paint circulating systems. Five of the seven lines carry paint to an equal number of spray booths in the first floor spray room. Two of the five lines continue on to a group of four spray booths on the second floor of the plant. A sixth paint line serves the second floor booths only. A seventh line runs to a group of dip enameling tanks located on the first floor.

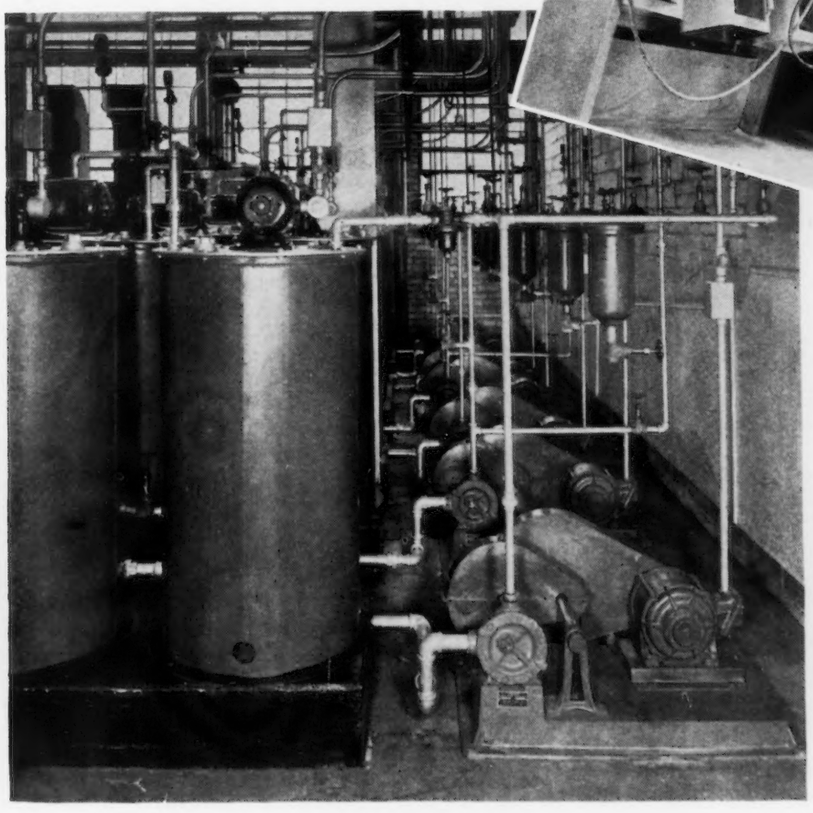
The smaller mixing room has nine mixing tanks from which two circulating systems carry paints to the locker assembly lines.

Together these two rooms provide air-conditioned storage facilities for more than 20,000 gal. of enamels and lacquers, maintaining a year-round temperature of 78 deg. F.

FIVE paint lines serve the first floor spray room which has five spray booths. Adjustable fluid regulators directly above the operators' heads regulate the spraying pressure to be obtained from each line.

BELOW

EACH mixing and circulating tank has its own pumping unit and filter. The mixing room is air-conditioned, using an exhaust system which withdraws air from both a low and a high level to maintain a year-round temperature of 78 deg. F.



The first floor spray room, with five lines serving each of five spray booths, is about 300 ft. from the larger mixing room. Three of the four booths on the second floor, each served by three paint lines, accommodate two operators each, making a total of seven work stations involved. The longest distribution line, 1600 ft., runs from the main mixing room to the dip enameling area, where there are three outlets for three dip tanks.

One-in. pipe was used on all distribution lines having a total length of 1000 ft. or more. Three-quarter-in. pipe was used for all runs of less

than 1000 ft. in length. In every case the same size pipe was used for the entire length of a line. For all changes in direction, 12-in. minimum radius bends were used instead of pipe fittings.

The various pipe lines are currently being used to circulate the following colors for the following products:

Color	Product
Green dipping enamel	Shelving
White synthetic enamel	Roaster cabinets
Gray synthetic enamel	Liquid gas cabinet
Green snythetic enamel	Furniture
Black synthetic enamel	Furnace jackets and sink cabinet bases
White synthetic enamel	Kitchen cabinets
Ivory synthetic enamel	Automotive display cabinets
Olive green lacquer	Locker door and frame assemblies
Brown lacquer	Locker door and frame assemblies

on it two aluminum paddles of the propeller type. A ¼-hp. explosion-proof, gear-head motor mounted on top of each tank is used to revolve the paddles at 59 r.p.m. Anti-whirl baffles are welded to the inside of the tanks to prevent swirling of the material. The paddle blades are designed with an angle of pitch which tends to throw or lift the paint material upward as they are rotated. In this fashion the heavier pigments that otherwise would tend to settle out of solution with the lighter solvents are kept thoroughly mixed. Fig. 1 is a sketch of the mechanical mixing equipment.

Primarily there is no difference between the function performed by the larger group of 14 tanks, Fig. 2, and the smaller group of six tanks, located along the opposite wall of the same room. They are all mixing tanks equipped with mechanical agitators. However, there is a difference in the way the tanks are used. The larger group is operated in conjunction with the seven pipe circulating systems for handling production colors. The smaller group is used for mixing batch quantities of paint required for short runs of special colors.

Each of the seven circulating systems in the larger mixing room is equipped with an internal gear type of pump driven by a 1-hp. explosion-proof motor. These pumps deliver 5 gal. per min.

In the smaller mixing room compressed air is used to force the paint out into the lines. Small air-motor-driven internal gear pumps keep the liquids circulating. Less expensive than the others, this type of unit is satisfactory for short runs of pipe which, as in this case, have only one or two outlets.

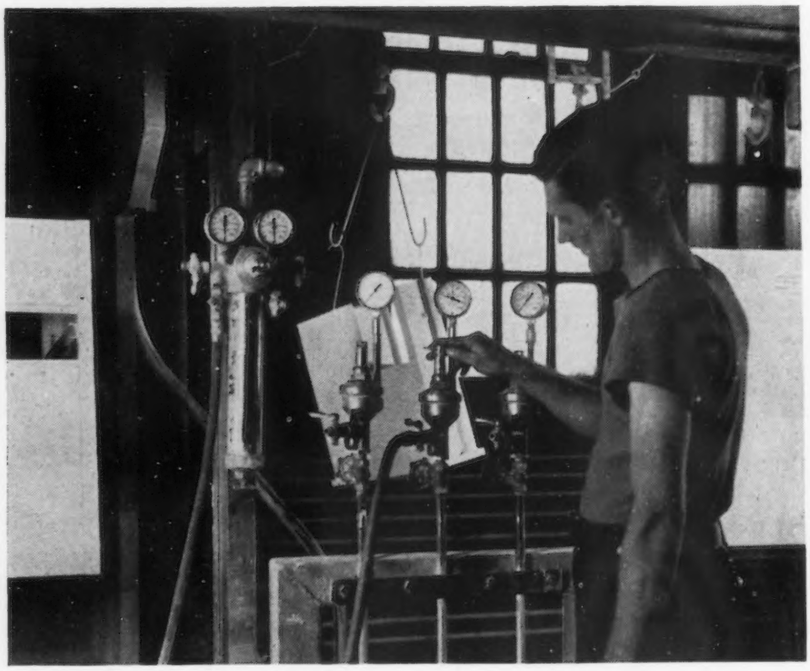
Located in each pipe line system just beyond the pump is a mechanical filter. In Fig. 2, this is the cylindrical object between No. 6 and No. 7 tanks and above the pump.

The circulation cycle is from the tank to the pump, through the filter, out into the line and return to the tank. Consequently the paint is continuously filtered as it is circulated and before it enters a distribution line.

To maintain uniform spraying pressure, each outlet in each pipe line is provided with a fluid regulator to reduce the line pressure to the desired spraying pressure. Each regulator has a removable key adjustment and a pressure gage for indicating the selected spraying pressure. Only the supervisor is provided with a key to operate the regulators. This centers on him the responsibility for always using the correct spraying pressure.

The advantages derived from establishing the paint circulating system in conjunction with the centralized mixing and storage facilities are already returning handsome dividends on the investment.

There is no longer any chance of dilution of the paint or of dirt getting into it since it is now delivered to the spray guns exactly as mixed. With each outlet provided with an individual pressure control, it is possible to obtain and maintain a uniform spraying pressure which is also the correct pressure for the particular application of enamel or lacquer used. Regardless of the location in the plant, the paint is now sprayed under the same conditions of pressure, viscosity, and specific gravity. This is particularly important where parts finished on different production lines are subsequently expected to match identically as to color in final assembly. Finally, due to the large storage facilities now available and the ability to maintain a uniform temperature of 78 deg. F. the year-round, larger quantities of the paint materials can be purchased at one time, and the last step provided in insuring uniformity of color.



HERE a supervisor is adjusting one of the pressure regulators in the paint line at a second floor spray booth.

Back in the mixing rooms the circulating units which mix the paint materials and feed them into the distribution lines are made up of a pair of mixing tanks (one used for mixing, one serving as a reservoir), a pump unit, a filter, and the necessary valves, gages, and piping to and from points of use.

Each tank is equipped with a mechanical agitation unit. A vertical shaft extending nearly down to the bottom of the tank has assembled

New Vitreous Enameled Murals

THE first United States Government commission for murals designed in vitreous enamel on steel was awarded to H. Edward Winter, Cleveland designer and artist who, ten years ago, pioneered in the field of enamel metal murals (see THE IRON AGE, Feb. 22, 1934, pp. 24-25). Executed under the Section of Fine Arts, Public Buildings Administration, this mural work was awarded after anonymous competition, and was completed in the laboratories of the Ferro Enamel Corp., Cleveland, with whom the artist is affiliated.

The mural was designed for the new post office building at Cassville, Mo., and was recently installed. Composed of three separate panels, each 4 x 5 ft., covering an area 5 x 12 ft., the subject matter of the murals consists of fruit, flowers, plants, birds and animals that are native to the State of Missouri, and are portrayed in full realistic colors.

In producing vitreous enamel murals, there is little departure from standard vitreous enameling practice. The decorative colored enamels are sprayed or brushed on the sheets after they have been treated with an enamel ground coat which is high in cobalt content to improve the adhesive qualities of successive coats of enamel. The murals are then fired, as in ordinary practice.

Each panel for the Cassville post office mural received six firings in furnaces, the temperature of which was 1500 deg. F. The colors in the intricate designs were applied completely with a spray gun on 18-gage enameling stock, and the time required to finish the three panels was nearly three months.

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RIGHT

A PANEL from the mural for the Cassville, Mo., postoffice is shown here during processing. Designs are sketched on the steel sheets, and enamel of desired colors is applied with a spray gun.

o o o

BELOW

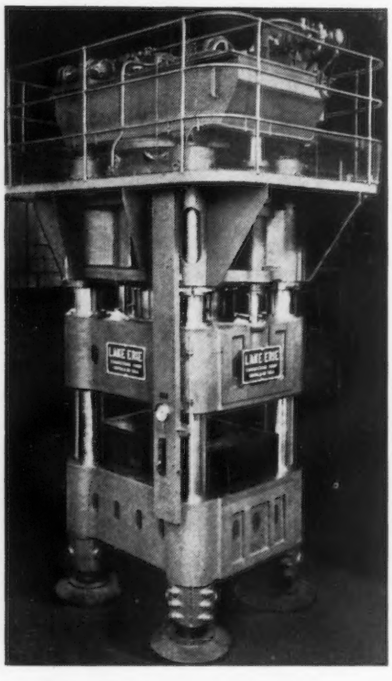
TO achieve the desired color intensity in the mural panels, they were fired six times for a period of three minutes each time at a temperature of 1500 deg. F.

New Equipment . . .

Presses

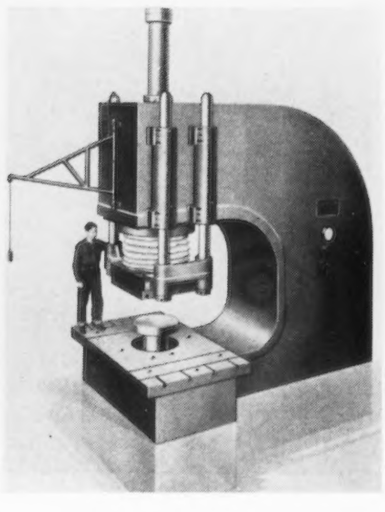
In this week's review of recent developments in metal forming equipment are outlined some new heavy duty hydraulic presses, knuckle joint, bending, marking and testing presses, new press attachments, and auxiliary material such as hydraulic pressure generators, valves and die cushions.

SINGLE action hydraulic aircraft press of 5000 tons capacity equipped with rubber pad, steel bolster and automatic motorized loading tables for high production of aircraft parts is announced by the *Lake Erie Engineering Corp.*, Buffalo. This self-contained press carries its 210-gal.-per-min. pumping unit on top and is powered by a 200-hp. motor. The standardized design combines fast operation, speedy changeover of dies, quick handling of stock and finished pieces with convenient controls, resulting in high output and low costs on both volume and limited production. Approach and return speeds are over 200 in. per min. and the pressing speed under maximum load is 7 in. per min. One complete stroke is performed in less than 30 sec. on an aircraft forming job. Platens measure 168 x 78 in., the daylight opening is 53 and the stroke 36 in. The unit is 28 ft. high. Push button controls are grouped conveniently and interlock for safety when two or more men operate the press. They provide for starting, stopping and semi-automatic operation and inching. There is adjustable pressure and stroke control.



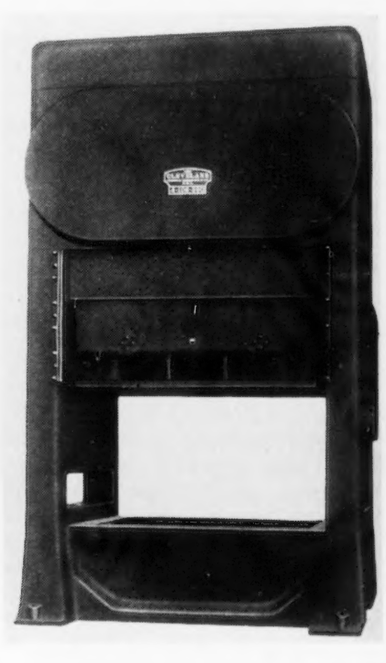
C-Frame Hydraulic Press

C-FRAME hydraulic press of a capacity of 400 tons combining a main ram, rapid traverse cylinder, and a stripper cylinder operated through the bolster, has recently been completed by *Denison Engineering Co.*, Columbus, Ohio. The oil reservoir, the hydraulic pump and motor, the motor starter, electrical controls and control valves are all assembled within the welded frame. After welding, the frame is annealed and normalized. The single-acting main press cylinder has a 30-in. stroke; the 36 x 36 in. platen and the 60 x 92 in. bolster are provided with T-slots for affixing tools. The double acting rapid traverse cylinder is flange mounted on the main press cylinder and has the same stroke and pressure. Down speed is 6 and up speed 10 ft. per min. The hydraulic stripper cylinder is also double acting. A pendant-type control station on a swinging bracket regulates rapid traverse, slow speed and reversing of the main ram. The stripper cylinder is operated from either of two push button stations on opposite sides of the press frame. All controls are coordinated and provided with safety arrangements.



500-ton Press

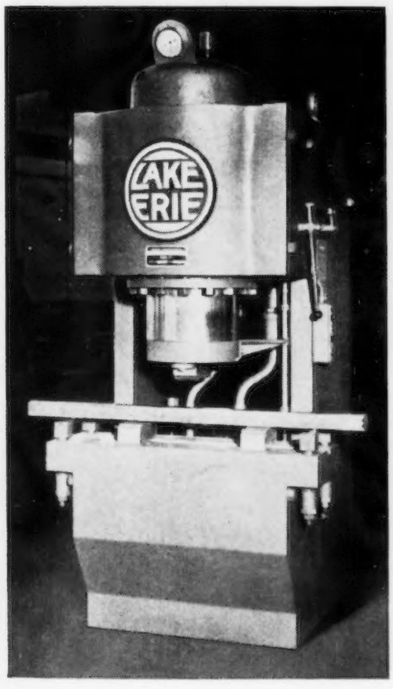
MODERN Cleveland four point press 108 in. wide exerts a pressure of 500 tons. The press is equipped with an electrically controlled, hydraulically or pneumatically operated friction clutch and brake. The flywheel is stopped



quickly by a separate air brake. The slide is counterbalanced by air and the cylinders are enclosed in the uprights, but are easily accessible. Side openings can accommodate automatic feed laterally across the dies and pockets are provided for the electrical equipment. Press operates 14 strokes per min. has a 24-in. stroke and 6-in. adjustment to the slide and can be furnished in sizes and capacities to suit requirements. The press has been designed to save floor space by avoiding overhanging brackets and projections. Drive and gears are located in the crown, they run in oil and an overflow limit in all gear housings permits the excess oil to return to the reservoir in the slide. The maker is *Cleveland Punch & Shear Works Co.*, Cleveland.

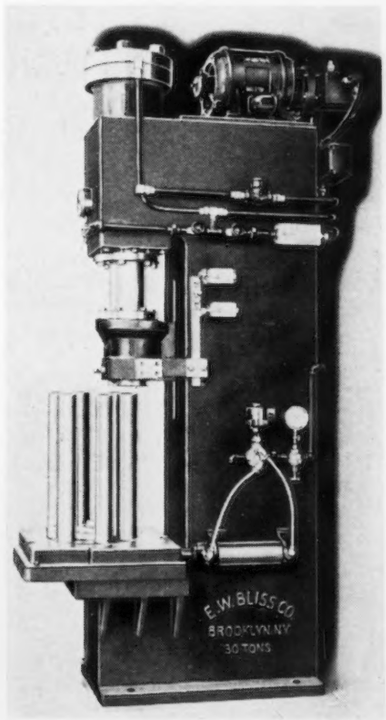
Straightening Press

HEAVY-DUTY hydraulic straightening presses are announced by the *Lake Erie Engineering Corp.*, Buffalo. The C-frame handles long bars conveniently and operation is fast with sensitive control of pressure and stroke. Bed is fitted with V-blocks adjustable to suit work. Spring rollers at ends facilitate movement of bars. Pressure control is exerted by conveniently located hand levers. The pumping unit is placed at the bottom and back of the press.



Marking Press

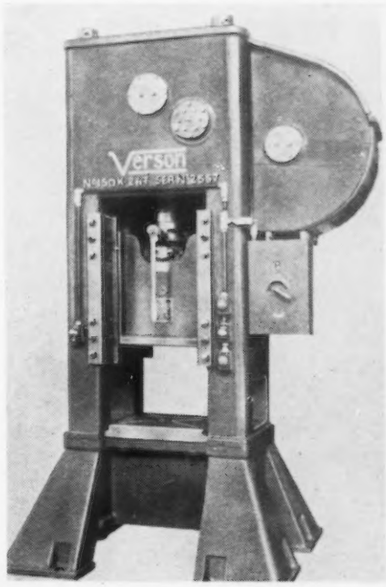
RECENTLY the *E. W. Bliss Co.*, 53rd Street and 2nd Avenue, Brooklyn, developed a high speed hydraulic marking press equipped with a dial feed. This press, with a 5-hp. motor, is of 30 tons capacity adjustable down to 3 tons with 12 in. stroke and the six station dial feed is pneumatically operated in sequence with the press stroke for continuous operation, controlled electrically by interlocks. Production up to 20 shell cases per min. can be obtained with this press, since the loading may occur during the pressing cycle. Press ram cannot descend until the dial is properly positioned and the dial cannot



rotate until the press ram is in the raised position. A no-work control prevents the press slide from descending when the machine is not loaded.

Knuckle Joint Press

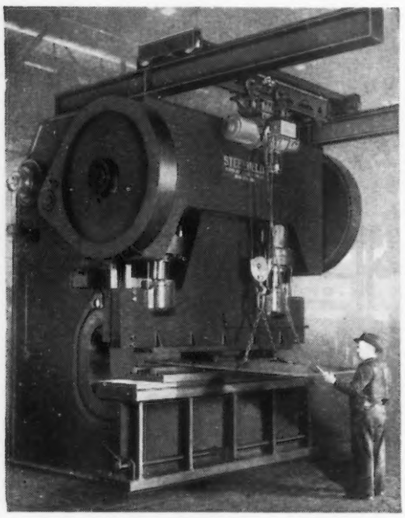
TO the line of forging and stamping presses of the *Verson Allsteel Press Co.*, 9301 South Kenwood Avenue, Chicago, has been added a new type knuckle joint press. This unit provides long stroke and long adjustment without sacrificing the very desirable knuckle action of the more common



type of knuckle joint and embossing presses. It is available in a full range of tonnage. Illustration shows a press of 150 ton capacity, 5 in. stroke and 5½ in. adjustment. The bed area is 26 x 26 in. and operation speed is 50 strokes per min. There is a full pneumatic clutch and brake unit with electrical push button control for automatic operation. The fabricated steel frame provides maximum rigidity with a high factor of safety. Various feed units can be adapted to this machine.

Bending Press

STEELWELD bending presses are now being equipped with individual overhead traveling cranes which make it easy to handle heavy plate. The cranes are mounted on top of the machines with crane runways extending approximately 8 ft. in front. The photograph shows the new combination used for the straightening of armor plate in thicknesses up to 3 in. Crane bridge and carrier are hand propelled, but the hoist is motor driven and is controlled by means of a pendant push button station. It has a capacity of 2 tons and a hoisting speed of 26 ft. per min. This Steelweld bending press model Mo 5-8 has a capacity of 450 tons and the bed top and ram bottom can accommodate wide dies. It is powered with a 40-hp. motor and has a speed of 21 strokes per min. All shafting is located at the rear of the machine. The ram may be adjusted by push button control over 6 in. to



accommodate various dies. A tonnage indicator tells the loadings to which the press is being subjected. Similar cranes can be supplied for all Steelweld presses. The makers are Steelweld Machinery Division, *Cleveland Crane & Engineering Co.*, Wickliffe, Ohio.

Hydraulic Press Control

ELIMINATION of shock in the operation of hydraulic presses is the purpose of a new pressure actuated prefill surge valve for automatic hydraulic press control, made by *Vickers, Inc.*, Detroit. This valve insures that the pressure in the main ram must be reduced to a nominal percentage of the maximum operating pressure of the system before the valve can open. The valve also incorporates as an integral part of its assembly the necessary sequence valves. A visual indicator enables the operator to determine at a glance the position of the main valve. Valves are available in 4, 6, and 8 in. nominal pipe sizes,

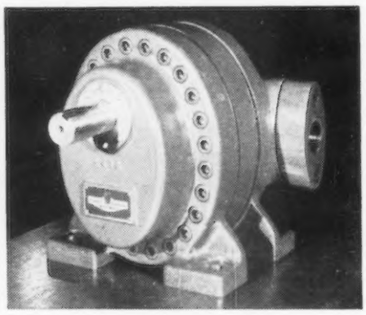
and are designed for operating pressures up to 3000 lb. per sq. in.

Vickers pressure switch for oil hydraulic machinery is sensitive and accurate type of rugged design for operating pressures up to 3000 lb. per sq in. It may be used with oils of various viscosities. An automatic pressure surge damping feature is incorporated which eliminates chattering. Generally used for the control of Vickers solenoid operated directional control valves, the switch may also be used to operate signals or indicating devices.

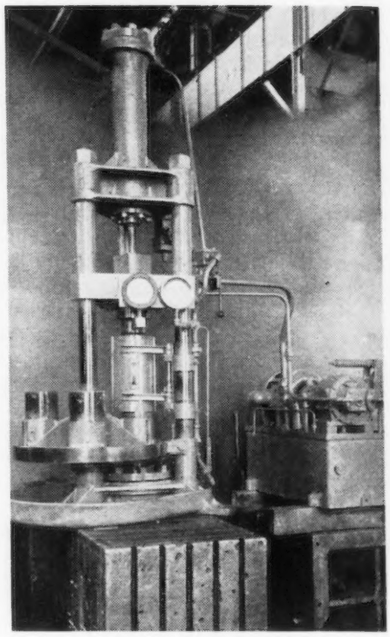
A new series of variable delivery rotary piston pumps also by Vickers have high volumetric and overall efficiencies at high pressure. Designed to operate at standard motor speeds, they are available in sizes ranging from 3 to 300 gal. per min. and for operating pressures up to 3000 lb. The pumping mechanism is self-contained within an oil tight housing arranged for either foot or face mounting.

Hydraulic Pressure Generator

LARGER size gear type hydraulic pressure generator has been announced by *Hydro-Power Systems, Inc.*, Mount Gilead, Ohio.



Model G-60 gear pump has a delivery of 60 gal. of oil per min. at 1000 lb. per sq. in. The heavy duty pump is a constant delivery type to serve as prime mover or auxiliary. Close tolerances are maintained between working parts so that pump output efficiency is high. Precision spur gears of narrow width and large pitch diameter are used. This design reduces both the hydraulic load on the gears and the distance between the gear shaft bearings, so that shaft deflection is minimized. Higher working pressures can be obtained efficiently. Gear shafts are mounted on Timken tapered roller bearings.

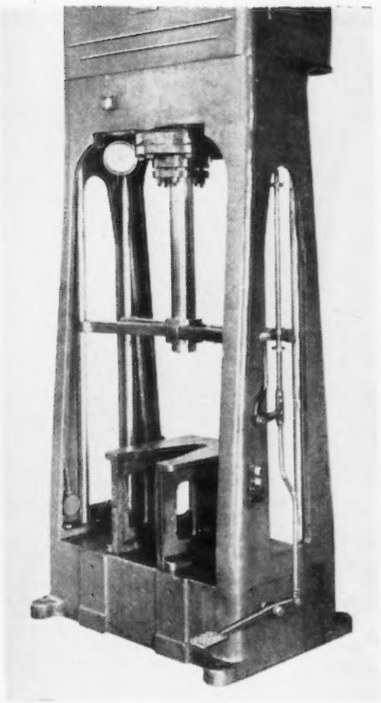


Shell Testing Press

SHELLS in which the inspector finds evidence of cracks or porosity must be tested hydrostatically; with some classes of 75 mm. shells the test pressure must be in excess of 20,000 lb. per sq. in. To meet these requirements *Baldwin Southwark Division*, Baldwin Locomotive Works, Philadelphia, built a turret type shell testing press. This completely self-contained unit tests approximately 60 shells per hr. Higher speeds depend upon the handling facilities available. The rotary turret carries fixtures for three shells. The questionable shell is placed under the test plunger and is clamped with a double acting hydraulic piston at the base of the machine. After closing the guard, the upper plunger is moved into the water-filled shell body, increasing the hydrostatic pressure within the shell to the point where cracks and porosity are shown by failure or leakage. A gage indicates the pressure within the shell.

General Purpose Press

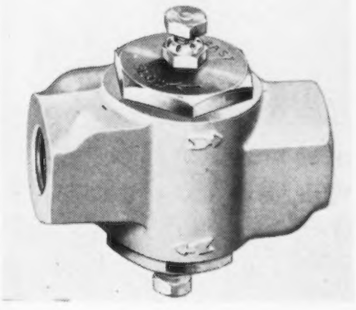
UTILITY hydraulic press suitable for a wide variety of work has been introduced by the *Diamond Machine Co.*, Philadelphia. This Diamond 40 press can be used for assembling, broaching, straightening, riveting, forcing and pressing operations. The machined steel ram is guided by a crosshead riding on four tension rods. The



high pressure Hele-Shaw pump, the oil tank and electric motor and their controls are grouped at the top of the press and all gages and controls are located at the front of the press. The base is 12 in. high and has a 10 in. hole centered under the ram. A 16-in. V-table is furnished with the press but 6 in. and 10 in. V-tables and a 12-in. extension table are accessories. Relief valves and overload relay protect against overloading.

Speed Control Valve

TWO-DIRECTION speed control valve has been designed and built by *Hanna Engineering Works*, 1765 Elston Avenue, Chicago, to control reliably the speed of pneumatically actuated cylinders for a maximum air pressure of 250 lb. Installed between operating valve and one end of the cylinder, one valve provides adjustable control of inflow and exhaust of the air, and, therefore, piston speed in the two directions. For especially sensitive control and adjustment, two control valves, one for each end of the cylinder, are recommended. The two orifices which control the airflow in two directions are set before the flow takes place. The valve body is cadmium plated and is made of corrosion resisting material. It is available in six sizes for $\frac{1}{8}$ to 1 in. pipe.



Pneumatic Die Cushions

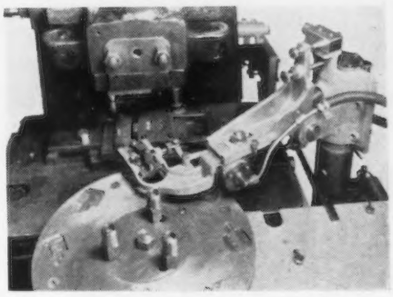
MODEL CCC pneumatic die cushion has been designed by *Dayton Rogers Mfg. Co.*, 2830 13th Avenue South, Minneapolis. These double tandem units are produced for extremely heavy ring holding pressures on large double throw, single-crank presses and are also used extensively on double-crank, double throw presses. Draw ring holding pressures from 25 to 100 tons are controlled by a combination automatic reducing regulating valve and pressure gage. The working

parts of the cushion cylinders are well protected against the intrusion of pierced slugs or loose parts. Leads carry the lubricant from the centralized lubricating block to the desired point on the cylinder.

This firm also announces a new Model GT counterbalance cylinder for large rams on straight side punch presses. Operating directly from the air line, these cylinders compensate for changes in the size of the die tooling equipment on the press ram. A press operating with a clutch jam may be operated without the use of the retarding brake as the cylinders used in groups 2, 4 or 6 will give the retarding action.

Punch Press Feed Unit

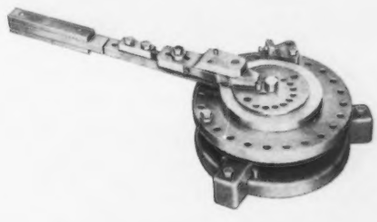
SAFETY for the operator and step up in production are claimed for a new development which is used to feed blanks to the die of a punch press. This attachment consists of a rotating index plate which is individually designed and supplied to work in connection



with existing dies. The operator places the work on the plate in the open and the plate controls the operation after being actuated by a food switch. A $\frac{1}{4}$-hp. motor rotates the indexing plate at a predetermined speed and in the proper position a vacuum or a mechanical pick-up arm transfers the blank to the die. If the machine should fail to eject the stamped piece or if two blanks should adhere to the pick-up arm, a safety limit switch will prevent operation and arrest the motion of the plate. *Heyman Co.*, 157 Chambers Street, New York, is the maker of this equipment.

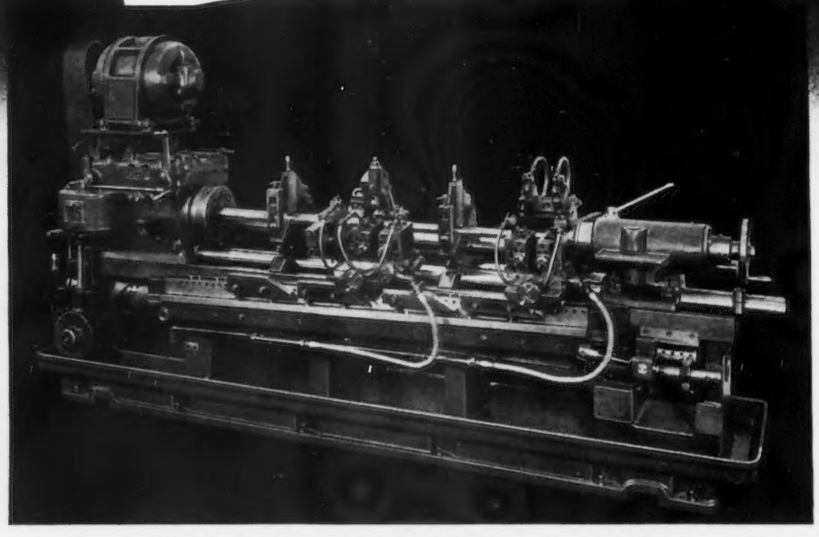
Duplicating Bender

FOR economical duplication of ductile bar or strip materials in outlines of regular and irregular radii with close tolerances without the use of dies, *O'Neil-Irwin Mfg. Co.*, 316 Eighth Avenue South, Minneapolis, is producing the No. 2 Micro Die duplicating bender. Thus $\frac{1}{2}$-in. cold rolled steel bar can be formed cold to $\frac{1}{2}$-in. radius and heavier gage can be formed if a greater leverage is applied.

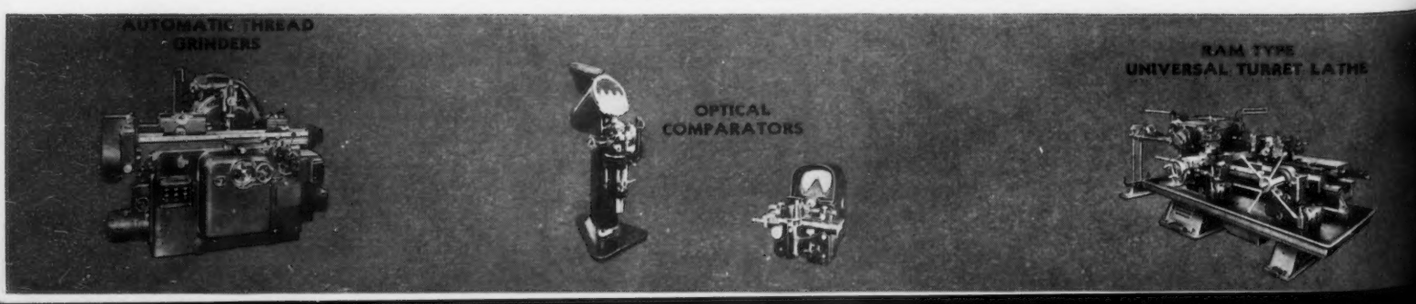


JAMES NASMYTH

IN 1851 at the Crystal Palace, London, the Duke of Wellington, James Nasmyth and Joseph Whitworth saw six American rifles taken apart, saw the parts shuffled and six rifles quickly assembled from parts chosen at random. Thus was interchangeable manufacturing introduced to England from a Vermont shop, of which the Jones & Lamson Machine Company is a direct successor. Thus also did this Vermont machine tool shop win the contract for equipping Britain's Enfield Armory — an early and bright chapter in Anglo-American cooperation.



Jones & Lamson 12 x 81" Fay Automatic
Lathe tooled to machine an aircraft cannon



H knew a good thing when he saw it.

NINETY years have passed since James Nasmyth, famous British engineer, arranged for a Vermont machine tool shop to equip the Enfield Armory for interchangeable manufacturing.

Today Britain again needs weapons and needs them desperately, and the same Vermont machine tool builders are gladly playing their part in the nation-wide effort to arm their friends in England.

The original shop has long since disappeared. The name of the firm has changed more than once. Three generations of eager, active, highly trained men have followed each other to eternal peace, each leaving behind an improved, advanced, more precise, more rapid machine tool technique.

That technique survives, but not even that survives unchanged, for the present generation of Jones & Lamson engineers is continuing to advance, refine and speed it up — with the same spirit and thoroughness displayed by its predecessors.

Herein lie many of the reasons why it pays to put your production problems up to Jones & Lamson engineers. Are you equipping for defense work or planning to keep down costs in postwar competition — OR BOTH? Let Jones & Lamson help you. Inquiries from large plants or small receive careful, thorough study, and illustrated catalogs of Jones & Lamson equipment are available.

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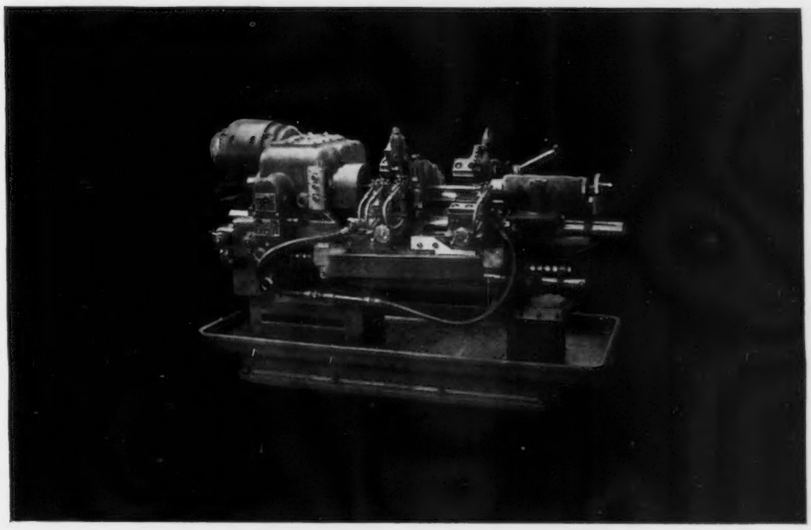
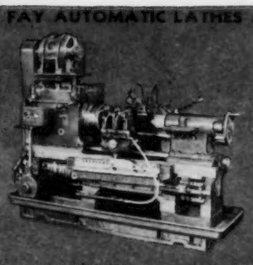
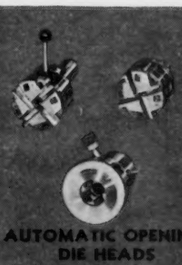


Jones & Lamson 8 x 33" Fay Automatic Lathe tooled to machine an automatic rifle barrel

PROFIT PRODUCING MACHINE TOOLS

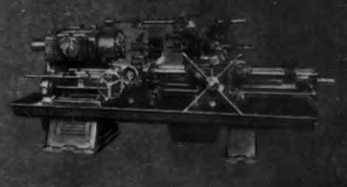
FAY AUTOMATIC LATHES





AUTOMATIC OPENING DIE HEADS

SADDLE TYPE UNIVERSAL TURRET LATHE



On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Barrage of protests ground Henderson's plan to cut automobile output 50% . . . Defense output peak looked for in 1942 . . . Inventory control cuts stocks at Detroit.

DETROIT — At the time this column was written last week, the auto industry stood committed to a nominal 20 per cent curtailment. The printer's deadline passed at about the same time that the industry was acclimating itself to Leon Henderson's announcement of a curtailment amounting to more than 50 per cent. It is difficult to write a column under such conditions of rapid change, but it is far more difficult for the industry to establish any production schedules when all of its planning is being done for it, extemporaneously, in Washington.

Auto plants had contemplated heavy production schedules in this next few months, the first of the 1942 model season. As reported here a week ago, some schedules were heavier than last August and plans called for a tapering of output as materials shortages made themselves felt.

Now all plans are in abeyance. The fate of the industry seems to be shuttling back and forth between OPACS and OPM viewpoints. President Roosevelt seemingly is siding with OPM, which favors less drastic curtailment than that announced by the magician-like Henderson, who pulled a statement out of his hat, so to speak, announcing the 50 per cent cut in a press release without any formal notification to automobile makers. The President softened up Henderson's production schedule, at least to the point of talking in terms of "substitution" instead of "curtailment." In doing that, he is at least approximating the vernacular of those who have not seen eye-to-eye with Mr. Henderson.

Those who have protested against curtailment most vociferously have been state and local government officials and labor. Automobile owners and drivers and automobile dealers throughout the country have added voice to the protest. Perhaps it is the vote-potential of the protesters that has caused some change in sentiment. Be that as it may, the change in sentiment has been expressed, and it is to be hoped there will be action substantiating the President's promise that drastic curtailment will not be permitted.

If Henderson's tentative program was merely a trial balloon to test out the reaction to the curtailment sought by Knox, Forrestal, Stimson, and Patterson for the past year, it certainly served its purpose and was promptly grounded by the barrage of protest.

Industry Has Not Complained

One thing remains to be made clear, however. That is, no protest has issued from the auto industry, although it has carried bales of data to Washington to point out the serious effects of unwarranted curtailment — especially curtailment that could not result in the manufacture of one more tank, gun, airplane or shell. The industry has hewed to the line in carrying out its promise to make defense its No. 1 job. In regard to curtailment, it has merely said: "Tell us what to build (for defense) and we'll build it, but don't tell us that we must not build automobiles."

Publicly the industry has remained pretty silent on the question of curtailment. Its attitude is explained in the following terms by one spokesman:

It is acknowledged that decisions on what products are needed for defense, what materials must be allocated to defense industry and taken from civilian industry, are justly the functions of government. Belief in this philosophy has restrained the auto industry from telling the government what it should do. Such lobbying as has been carried on, has been concerned primarily with seeking an orderly transition of the industry from normal output to defense production.

Change to Defense Too Slow

Authorities within the industry concede that a 50 per cent restriction on auto output may eventually force itself on the industry. However, it is difficult to see this coming to pass in the immediate future because the rate of absorption of manpower and materials into defense jobs is too slow for that. Sometimes the dramatic instances that are cited to prove need for drastic curtailment won't bear close investigation. As an example, the Navy Department has bared protests that it has been held up for steel because private customers were getting the material for non-defense use. One example supposed to be pertinent concerns production of Navy ordnance by an automotive concern. It was alleged that the Navy could not obtain steel for gun parts. The facts of this case are that the ordnance plant is only now under construction, will not machine any of the steel until the coming fall, and doesn't even have a place to store it now. A cursory checkup by the buyer indicated that the steel would be difficult to obtain. Somebody became hysterical and within a short time OPM had the task of finding the material. Among the items wanted—for immediate delivery, of course—were a great variety of special steels in small quantities. An open hearth producer, whose furnaces hold from 100 to 150 tons per melt, was asked about supplying 10 tons of a very special alloy. The steel company could obtain no commitment to cover the rest of the melt. Of course, the

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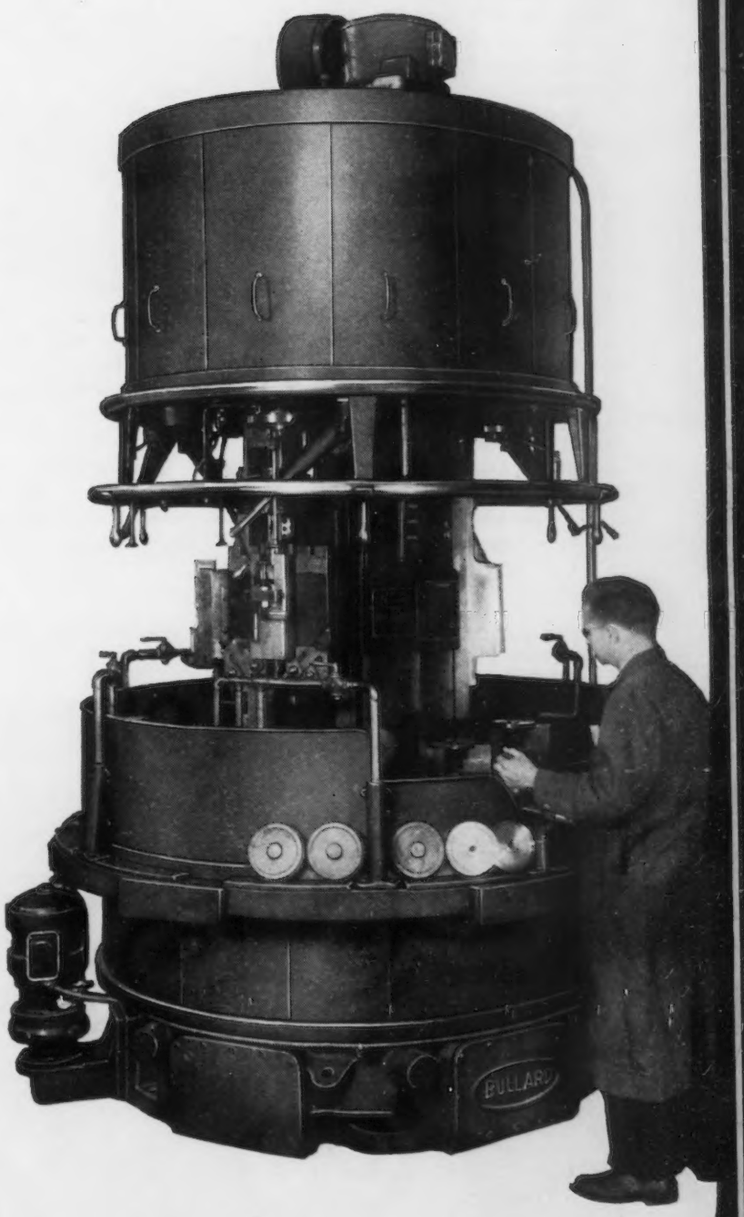


BULLARD

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

buyer and seller couldn't get together on that basis. That incident is one of the many similar ones that are being built up into a "case" to prove the existence of shortages.

To the credit of OPM must be put the fact that some officials are making serious attempts to coordinate demands for material like this. When that is done, there is no difficulty in getting the special alloys.

It is one of the absurdities of the defense effort that a private firm, unable to meet an isolated demand for 10 tons of a special alloy, should risk accusation that it was giving special preference to its old customers.

The commodity price level is on the upswing in spite of efforts by OPM and OPACS to restrain it. Despite strict control in the scrap industry, there has been evidence that prices above the ceiling level have been paid in attempts to get enough material to keep furnaces operating. Also, overgrading, equivalent to price boosts on lower grades, has been practiced. Reports from purchasing agents show a general upswing in other commodity prices which is attributed to increased labor costs and scarcity of materials.

In monthly surveys by the Purchasing Agents' Association of Detroit, higher prices are being reported month by month. In March 63 per cent of the buyers reported higher prices; in April, 73 per cent; in May, 82 per cent, and in June, 86 per cent.

This price pressure cannot continue much longer without being reflected in the consumers' goods field much more strikingly than it has so far. In the automobile industry any substantial volume cut will boost production cost still further, so Henderson's ban on price increases is undoubtedly going to be upset this fall.

Inventory regulations, plus difficulties in obtaining supplies of many materials, is trimming plant inventories closer and closer to the shelf. As recently as March, half of the important buyers in Detroit were able to make headway against the tide by adding to their stocks on hand; 39 per cent of the buyers maintained inventories steady, and 10 per cent reported a decline. The situation had very nearly reversed itself by June, when 50 per cent were just holding their own; 17 per cent showed losses and only 33 per cent were adding to inventories.

This adding to inventories has placed many plants in this area in reasonably safe positions, except that isolated shortages keep cropping up to throw production departments for a loss. Actual inventories, however, have decreased rather sharply in automotive plants, as 1941 material has been used up.

Automobile production in the industry for the past week was 105,635, compared with 109,912 in the previous week, and 34,822 in the corresponding week of last year, according to Ward's Reports, Inc.

AIRCOBRA PROPELLER: Details of the new propeller used on the Aircobra fighter planes were inspected recently by New York's Governor Lehman (right) and Lawrence D. Bell. *Photo by Wide World*

Auto Industry Gets 50% Cut Reprieve

Detroit

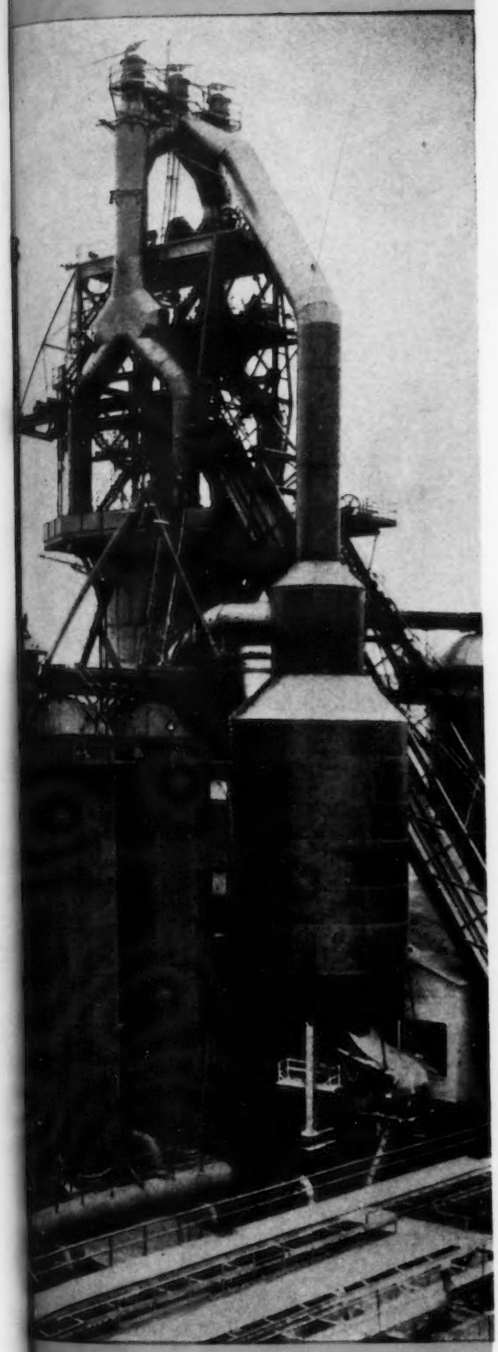
• • • **OPM late last week** granted a reprieve to the automobile industry from the order of OPACS which called for a 50 per cent reduction in output of passenger cars and trucks. Interpretation placed on this in Detroit is that President Roosevelt has definitely sided with William S. Knudsen and the industry advisory committee, headed by James S. Adams, against the action of Leon Henderson and Army and Navy officials who have opposed additional production of automobiles.

The reason given for the reprieve is that the automobile industry had already obtained sufficient raw materials for the next 10 weeks of production. This was indicated in the "Assembly Line" of July 24 in which it was asserted that schedules for the early months were already made up.

There is keen resentment in Michigan over reports that Henderson now says he never intended to enforce his order as of Aug. 1, but merely mentioned that date "in order to shock the industry into a realization of the existing situation."

The industry has long anticipated that severe curtailment would come when defense production reached a peak but its production planners, experienced in estimating production curves far in advance, have known since the inception of the defense program that peak military production was impossible before 1942, at least. It has been often re-emphasized in reports here on the automotive situation that eventual curtailment of 50 per cent or more might force itself on the industry.

QUICK RESULTS



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Washington

BY L. W. MOFFETT
Washington Editor

• Present need for steel won't be solved by long range expansion program . . . Civilian demand, which no one can estimate, is certain to suffer . . . Many additional steel priorities discussed.

WASHINGTON — Plans for further wide-scale expansion of blast furnace and steelmaking capacity do not solve the immediate problem of pressing demands. New construction will require from 18 months to two years.

It is freely admitted that at present there is ample capacity to meet defense requirements, though no one, either in or out of the government knows or can know what those requirements are. They readily concede that fact. This is because these requirements are changing about from day to day, always going upward. Yet heavy as they are growing, they are, of course, far below the capacity of the industry to meet American and British needs. Nor does any one know, nor can any one know what civilian requirements are. This is said despite the effort of economists to adopt a formula, based on national income, to determine civilian requirements.

It may be said in passing, however, the civilian tonnages estimated by OPM economists are so greatly in excess of the total steel consumption of 68,000,000 tons in 1940 that the economists' figures are not generally given much weight. That the reliability of the estimates of the OPM Bureau of Research and Statistics are doubted, is understandable when their magnitude is realized. The bureau fixes civilian demand for the calendar year 1941 at 72,500,000, and for the calendar year 1942 at 88,600,000 tons!

But regardless of what the civilian demand is or will be, whether large or small, it will have to suffer, as extremely important as much of it is, in order to make way for urgent defense requirements, despite their relatively small quantity when compared with total capacity, whether at a former estimate of about 30,000,000 tons or less for 1941 and 32,000,000 tons for 1942. These are only rough figures, and except as possibly indicating maximum requirements for the United States and Great Britain and her possessions, they are given no great value.

Hump Makes Priorities Necessary

The reason civilian demand will have to be curtailed, regardless of OPACS assurances, is that the defense requirements are concentrated, and new construction is not the answer to the immediate problem. If this hump could be leveled out or reduced appreciably, the present capacity would be more than adequate with heavy tonnages available for civilian allocation. Since this can not be, the question is one of priorities.

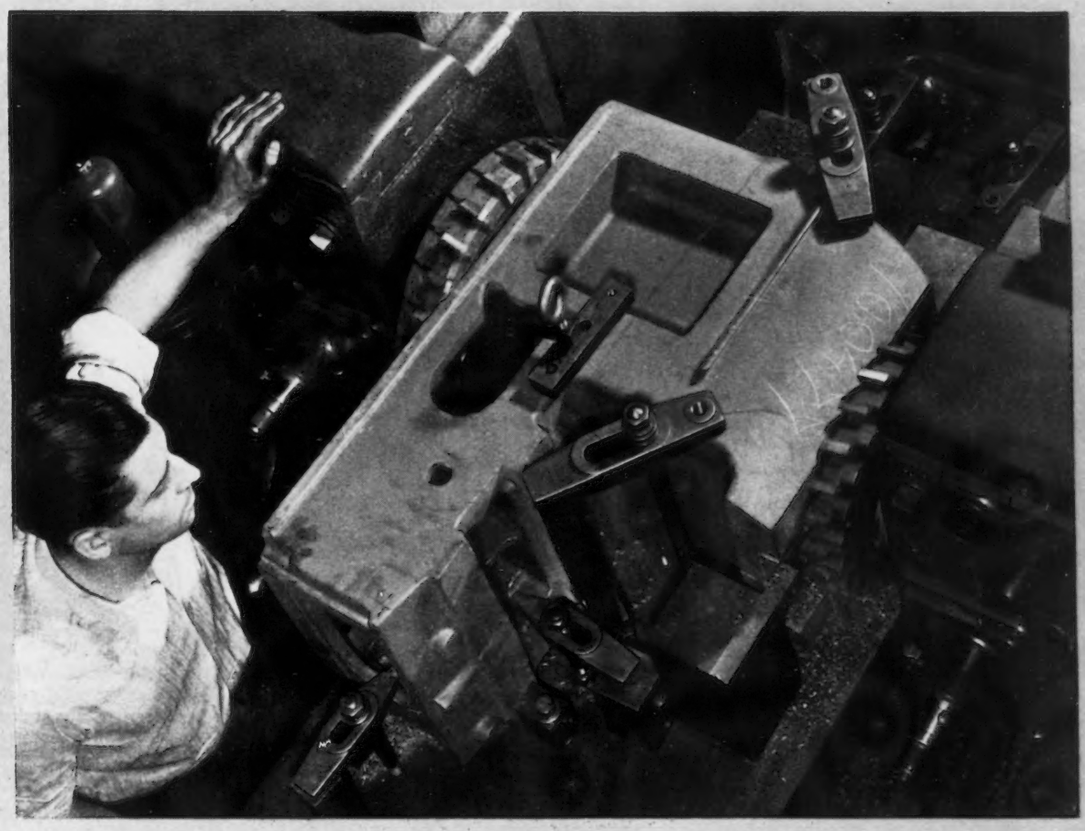
The point has been reached where there may have to be a reshuffling of ratings. It will be no simple job. Determining what line of defense production deserves a preference over another often is difficult and it has complications. But in view of developments it may be necessary. Carbuilders, for instance, are said to be so short of steel that they are able to operate at only about one-half capacity, despite their A-3 ratings.

It is reported that other producers on equally as important lines with the same rating are also having difficulty in maintaining operations because of insufficient steel supplies. The hump has bulged out increasingly, and in Administration quarters it is claimed it will not be leveled out until late in 1942—when a great deal of new capacity will be available. Right now the hump is getting greater. All sorts of additional steel priorities are being discussed—steel priorities for pipe line construction, for oil tankers, for steel drum, for electric utilities and what not.

Some of these will have to wait, just as civilian requirements are going to be increasingly subordinated to defense needs. Meantime, however, revision of the priorities may be necessary, giving preference to certain tonnages that heretofore took a lower rating than was justified.

↓ ↓ ↓

A civilian allocation program providing that manufacturers of farm machinery and equipment be given the "highest civilian preference rating" for materials to be delivered during August, September, and October, but that these materials shall not amount to more than 20 per cent above the quantity used during the corresponding period of 1939 or 1940, whichever was higher, was issued on Wednesday of last week by OPACS Administrator Leon Henderson. He said that the program, which is to be administered by the OPM Priorities Division, is designed to insure an adequate supply of raw materials for manufacture of farm machinery needed for maintenance of the nation's food supply and to avoid working a hardship on the country's farmers. The program provides that the preferences granted shall not be used to accumulate inventories. Furthermore, manufacturers are required to conserve critical materials and to plan production in accordance with the national need for different kinds of farm equipment. In submitting requests for priority ratings, manufacturers must attach statements of how they intend to comply with these requirements.



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POWER TAKES A FRONT SEAT HERE

OF the many factors affecting the production obtainable with a given part, the rated power of the machine tool occupies a prominent position. True, maximum power may not be used for every job, but for many of them the speed and feed and the number of simultaneous cuts are directly dependent upon the ruggedness of the machine.

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TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

Photo by International

U. S. DESERT "WARFARE": At this anti-aircraft gun range in the Mojave desert, gunners are free to shoot into the air in any direction at passing targets without fear of damaging property with falling shrapnel. The range is used for training gunners from Camp Haan, near Riverside, Cal.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

KIDS! KIDS! KIDS RUNNIN' MACHINES--KID SUPERINTENDENTS--KID FOREMEN--KIDS RUNNIN' EVERYTHING! WHERE'S TH' MEN OF EXPERIENCE... MATURE MEN... OLD HEADS?
WELL, YOU KNOW, HACK, MOST O' THEM WAS IN TH' LAST WAR... AND, WELL, YOU KNOW WARS DOES THINGS TO SOLDIERS
AN' THEM WHO WASN'T WORE OUT IN THE ARMY GOT WORE OUT LOOKIN' FER JOBS--A FEW OF US DID LAST TILL THIS ONE
WELL, THAT'S WHY TH' KIDS! BECAUSE EVEN YOU ARE TOO FAR GONE!
THE WAR HORSE
J.R.WILLIAMS 8-8
COPR. 1941 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

Steel Priority Specialists Attend Training Clinic

• • • **E. R. Stettinius, Jr.,** Director of Priorities, has announced that the Priorities Division will hold a series of training courses during the next several months for business and industrial priorities specialists.

These meetings will be open to officials appointed by their companies or trade groups. A number of plants recently have appointed members of their staffs to specialize on priorities problems.

More than 100 priorities specialists from the steel industry attended the first training clinic on July 18, heard members of the Priorities Division staff explain procedure, and took part in round table discussions on problems which have arisen in their field.

The next training course will be for trade association executives and will be held on Aug. 1 in the new Social Security Building. Any association which wishes to send a representative should communicate with Mason Manghum, head of the Industrial Contact Unit, Compliance Section, Division of Priorities.

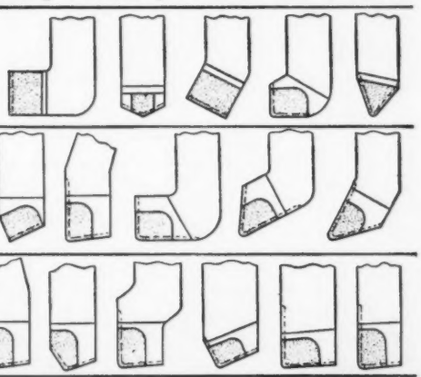
From Blueprint To "Tool-up" In Less Than 1 Hour!

Braze Your Own Carboloy Tools . . . Get Them On Emergency Jobs *FAST!*

Emergency periods call for quick action. When a job must get under way fast—when you need Carboloy tools "yesterday"—*why not braze your own Carboloy tools?* . . . It's a simple short cut that eliminates ordering time and avoids routine "hold ups" awaiting deliveries.

Many plants now keep a stock of Carboloy Standard Blanks in their tool crib . . . ready, on a moment's notice, to make up a tool and get it on the job *fast!* . . . less than an hour for most single-point, straight-shank tools!

A Few Typical Tools You Can Make ...Using Carboloy STANDARD BLANKS



CARBOLOY STANDARD BLANKS ARE AVAILABLE IN 2 STYLES, 65 SIZES AND 3 GRADES

STYLE 100

STYLE 200

Just three simple steps are necessary to do this in your tool room.

1. Preparing Recess in Shanks

To accommodate the Carboloy blank in your tool shank it is necessary to provide a recess in which the Carboloy Blank can be inserted. This is a simple operation that can be done on your regular tool room milling or grinding equipment.

2. Brazing Carboloy Blank to Shank

Brazing the Carboloy Blank to your shank requires less than 5 minutes on most straight-shank, single-point tools. To do this you simply need a torch, and a few inexpensive accessories: Silver solder, flux, carbon tetrachloride, etc.

3. Grinding the Brazed Tool

Simple—fast—as easy as regrinding dull carbide tools, using the now-established, rapid grinding technique, and your regular carbide grinding equipment.

With these three simple steps you're prepared to meet emergency requirements immediately. Why wait—when you can get tools on the job *FAST*—by this simple procedure? Write for instruction booklet GT-116.

CARBOLOY COMPANY, INC.

11153 E. 8 MILE DRIVE, DETROIT, MICH.

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CARBOLOY

Reg. U. S. Pat. Off.

STANDARD STOCK BLANKS
2 STYLES • 65 SIZES • 3 GRADES

San Francisco

• • • **Rapidly dwindling** stocks of Pacific Coast steel warehouses, with prospects of early replacement slight, indicate that small users of steel will be seriously cramped in their operations within the next six months.

Even though warehouses are given some sort of a priority rating to improve their position in getting stock replacements from the mills, it will be little more than a ticket for them to stand in line behind those with prime priorities, the warehousemen fear. Any preference status given the warehouses for replenishment of stock would most likely be based on sales to defense customers during a preceding period of time, possibly 30 or 60 days. The theory behind such a priority would be that the warehouses are extremely valuable as emergency suppliers of small needs of large defense organizations, that their stocks are an exceedingly valuable cushion when mill orders are unavailable on short notice, and that they constitute the regular source of supply for a rapidly increasing number of small national defense contractors. This is sound logic proved in past practice.

Nevertheless, even at best, a priority for steel warehouses on the basis of sales to defense consumers would be no boon to customers not engaged in defense work. If their right to replenish stocks depends entirely upon showing that depletion was due to sales to holders of priorities, excessive sales to non-priority holders in scarce items could quickly lead eventually only to cobwebs on the cash register. Thus, the non-defense customer whose normal source of supply is the warehouse will be aided little even if the warehouses obtain priority status.

As far as the Pacific Coast is concerned, the prospect for non-defense warehouse customers is equally or more gloomy if the warehouse should continue to operate without preference. A cross-section survey of Pacific Coast warehouse inventories as of June 1, 1941, shows that they were 38 per cent lower than on Jan. 1. Only one other section of the country shows a greater percentage of decline and most districts show nowhere nearly as great a rate of depletion during the first five months of this year. Pacific Coast stocks as of June 1 were sufficient to fill only 2.1 months' demand assuming sales continued at the average rate shown during April and May. Pacific Coast inventories were sufficient to last a shorter time without replenishment than any other territory in the country. If warehouse stocks continue to diminish at the present rate, and no relief is afforded through more rapid replenishment by the mills, it looks like an extremely slim Christmas for far Western warehouse customers.

• Coast steel warehouse stocks decline with little help seen from priority rating . . . Inventories 38 per cent lower than on Jan. 1 . . . Plan for Oregon's first steel rolling mill announced.

More rapid depletion of warehouse stocks on the Pacific Coast than in other parts of the country cannot be attributed altogether to distance from mills, for inventory depletion in Pittsburgh is nearly as great. However, the Coast warehouses are not in such a good position to make stock replacements in that they have fewer alternate sources of supply in this territory. Whether a large number of alternate sources of supply is any major advantage in a period of consumption equaling or exceeding production remains to be seen. Certainly, no cases of excessive stocks or hoarding have yet come to light on the Coast.

Inventories on Jan. 1 were little if any larger than normal for this period of the year, not usually one of high inventories. One may theorize that consumption among warehouse customers has been somewhat greater in relation to normal than in other parts of the country because of the extremely rapid growth of defense industry here from a very small base. A period of infancy and plant equipping might be expected to exert a somewhat heavier drain on warehouse stocks than when the wheels of industry begin turning faster and mill sources of supply can be regularly drawn upon. If fewer new industries are established in the future, and this theory is sound, then some decline in demand from this source might be expected. On the other hand as industry swings into high gear, and as defense contracts become diffused more and more among small machine shops, pressure on warehouses from this type of customer should increase rather than decrease.

Ability of warehouses to replenish their stocks as fast as they are depleted is not likely to improve. At least two different policies have been adopted by mills toward Pacific Coast warehouse orders. A large number of the mills, including most of those whose entire operations are in the East, have accepted orders on a quota basis. The amount each warehouse has been allowed to order has been in relation to orders placed during the same period last year—sometimes an amount equal to last year, and sometimes a portion of that amount. This, in effect, is a policy of guaranteed protection for regular customers in so far as mandatory allocations will

allow. Another policy, said to be followed by at least one mill, has been to accept all orders with the exception of those for certain "gold-plated" items, with delivery date extending into the future. Recently, pressure exerted by priority orders has warped these delivery dates noted at time of booking farther and farther away. What might have been regarded as foresight in anticipating demand, at the time orders were placed, has gone for naught. Now, it is understood, tentative delivery dates have been wiped off the slate entirely with the substitute promise that orders will be filled in turn after priority customers have been taken care of. On construction steel particularly, this is not much solace, because of the large military projects on the Coast and in adjacent outposts. Orders on galvanized sheets are not being accepted by at least one mill.

Even where a large inventory increase with the realm of possibility, it is doubtful whether buyers would bring it into reality. Memory of the last war, when orders were filled in a sudden flood after the armistice, still stands as a caution light.

Plans to erect Oregon's first steel rolling mill in Portland with the hope that operations may be started within the next 60 to 90 days has been announced by Morris Schnitzer. Mr. Schnitzer, with his father, Sam Schnitzer, has been active in the metal business in the Northwest for many years. The new firm, Oregon Electric Steel Rolling Mill, Inc., lists an initial capital of $250,000. The firm sets as its goal an annual capacity of 60,000 tons annually, operating two top charging electric furnaces. Merchant bars, structural shapes and forging billets are listed as mill products. Mr. Schnitzer believes he can obtain the necessary equipment, and assemble his organization to meet the short deadline he has set for the commencement of operations. One furnace now is en route to Portland from the East and the remaining equipment has been ordered and will be shipped promptly, he states.

Bonneville power will be used if it can be obtained. Employing a scrap steel charge, the firm is well supplied.

Despite curbstone hearsay and prejudiced popular opinion to the contrary, the West Coast has had, is having and probably will have far less than its proportionate share of man day losses because of strikes, in comparison with other cities and regions of the country. Strange as it may appear, according to the Bureau of Labor Statistics figures, San Francisco was the best city on the Pacific Coast and one of the best in the United States for 1940, in its strike record. The situation has so far continued this year in at least as favorable a proportion. Of 15 principal cities in the United States which had 25 or more strikes during 1940, San Francisco was 12th on the list with 31 strikes as compared with 445 for New York and 70 for Philadelphia. In workers involved, San Francisco was last on the list with 1967, only 2½ per cent of New York's 87,000 and less than 10 per cent of St. Louis' 20,000. In man days idle San Francisco was 13th with 44,000, less than half of Los Angeles' 100,000 and 20 per cent of St. Louis' 214,000.

On the West Coast in previous years San Francisco had passed through the fire of labor conflicts, and from the furnace emerged the plan for industry and trade wide agreements. There are now 60 such master contracts in force, covering not only all retail trade and wholesale distribution, but major manual and craft workers. This originally city-wide plan has been extended to Coastwide contracts governing shipbuilding and the waterfront and ocean going workers. It seems probable now that the next such master Coastwide contract will be worked out for the aircraft industry. Roger Lapham, member of the National Defense Mediation Board, is a San Francisco business man who was instrumental in working out these first industry contracts, and William H. Davis, chairman of the board, is intensely interested in these possibilities according to reports. The United States Department of Labor has become keenly interested in the possibilities of these contracts, and employers, industries and trade that have gone through the course of conflict with organized labor find that this is the fairest and most effective means of a satisfactory mutual adjustment.

Photo by Harris-Ewing

SUPER-FLYING FORTRESS: Shown here is a closeup of the Army's new experimental bomber XB-15, the largest plane of its kind ever developed in the United States. The pilots' compartment and blisters which house the machine gunners in this Super-Flying Fortress can be clearly seen.

Fatigue Cracks

BY A.H.DIX

Easy Come, Easy Go

• • • The guvment has a way of straining at gnats and swallowing camels. Which is why your favorite family journal's long-legged Cleveland reporter, Don James, gulped at this statement in a recent issue:

> John D. Biggers of OPM had 11 days to go to round out a year's work when payday came recently. He received a check for 97c.

Don figures that eleven days off at 0.274c. a day makes 3.014c. Deduct that amount from the year's salary of $1 and you get 96.986c. Mr. Biggers was therefore paid 0.014c. in excess of the amount called for in his contract. While the amount is small, the principle involved is large. We view with alarm this tendency toward rounding off fractions to an even figure on the high side.

Fairness has nothing to do with it. A government is under no compulsion to be fair. Once it departs from a strict heads-I-win, tails-you-lose policy, it is doomed. While obviously it would have been impossible to pay Mr. Biggers 986/1000ths of a cent, the sound way would have been to bring the amount *down* to the next even penny, not *up*. He should have been paid 96c. He might have squawked, but better one disgruntled government employee than an easy come, easy go attitude in the disbursing of public funds.

Pictures with Punch

• • • The editor and cartoonist of the Wallace Barnes Co.'s house magazine, *The Mainspring*, have a rare genius for evolving cartoons that not only delight the eye but which lubricate the flow of ideas from text to reader's mind. Below are some of the cartoons that illuminate a discussion of torsion spring design.

The maximum stress occurs at the surface along the outside diameter.

Advantages in the larger sizes due to better material control.

Extremely short ends should be avoided as this causes difficulty in coiling.

When the spring is "loaded" the coil will wind up.

Fabulous Chair

• • • The brains department sees to it that, by actual page count, you get more mental pabulum here than you can elsewhere, but even then the weekly dragnet brings in from two to three times as much material as is used. So our Brisbanes can afford to be extra-choosy about what they regard as worthy of meeting your eyes.

Their standards are towering, but sometimes we wish they would nod a bit. One of the times is in the case of an offer from a freelance writer in the hinterlands to get us a story about a novel chair invented by a Kansan, to enable him to carry on life without getting up. The chair is equipped with barbering tools, breakfast set, smoking stand, Bible case, fan, card case, and 182 other things.

Our curiosity as to the nature of the 182 other things is high, but it will probably never be satisfied, as the brains department wrote coldly that (1) it had heard of the chair, and (2) it thought the best place for a description of it would be in a publication devoted to abnormal psychology.

Aptronyms

• • • D. R. Clarkson sends us a newspaper clipping stating that Parke Wright, a Buffalo broker, was recently fined for overtime parking.

Charley Heale, editor of our sister publication, *Hardware Age*, says that for years the town constable of Upton, N. J., was a Mr. Knab. Years ago, when Charley was managing editor, the editor was Llew Soule (pronounced *sole*).

And then there is the case of Harry E. Bolt, of the Indiana Bell Telephone Co., who recently joined the army, and whose work has been taken over by Adrian B. Nail.

Blurb

• • • The pride of a new corporal in his chevrons is a feeble thing compared with the pride of a publisher in a high subscriber renewal percentage. And with good reason. The absolute measure of a publication's standing in its field is the proportion of subscribers that renew.

The DiMaggio of its field is your favorite family journal, whose coming circulation statement will show a renewal figure of higher than 81 per cent, thanks to you.

Confession

• • • Before the anonymous, flyspeck-finding Deac gets after us we will confess error in the phrase ". . . *beyond the scope of several more complete directories*," which appeared in the series, "1500 Tool Steels." *Complete* is, of course, an absolute word, like *perfect*, or the *goodness* of an egg. There are no degrees. Either it is or it isn't. The tool steel directory, for example, is complete. It is now being printed in handy pocket-size form, 5½ in. by 7½ in., about 64 pages, and you can get a copy for 25c. in stamps.

Puzzles

The answer to last week's balm for tired minds is 219,438,657.

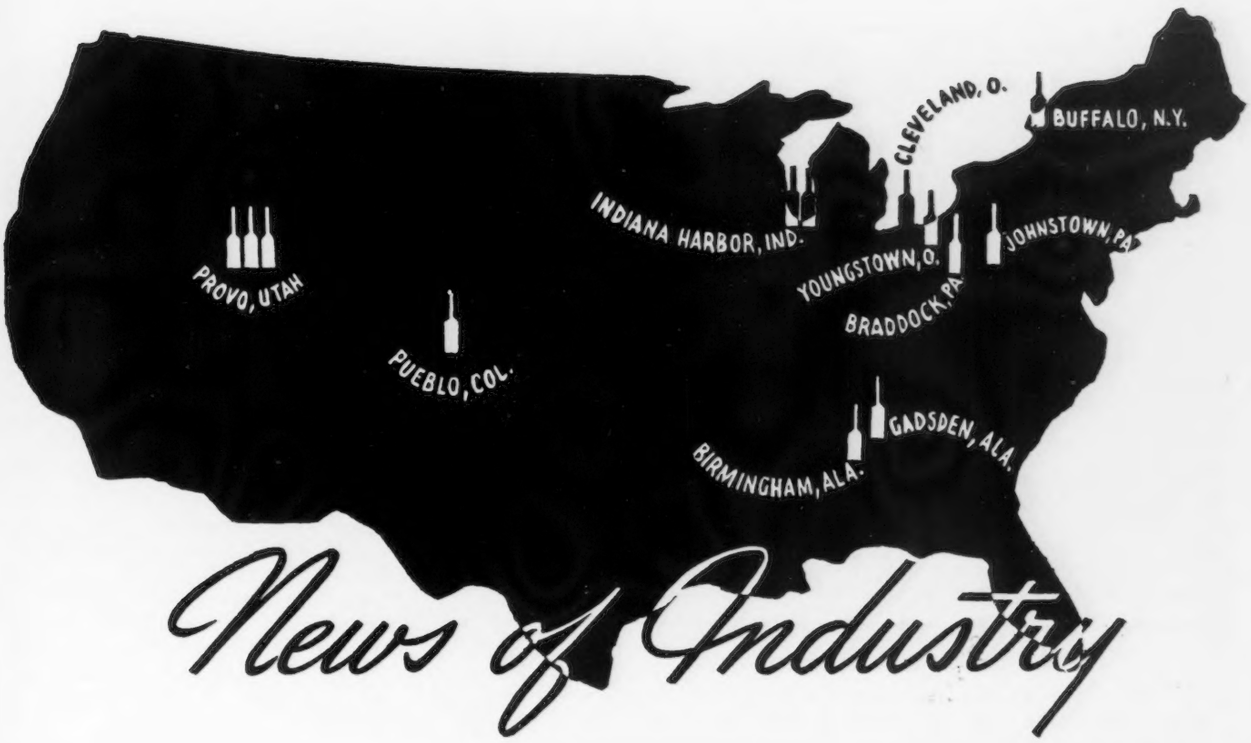
The July 10 pig-and-potato problem was nothing at all to Frank G. Norris, Lt.Com. A. R. Simpson, and W. C. Marshall. The last-named gives a suitable formula: $n^{n+1} - m\ (n-1)$, n equals the number of parts and m the remainder.

A batch of additional solutions to the problem of expressing a value for one-eighth by using only once each of the digits from 1 to 9 have come in from A. W. Kelly, Frank G. Norris, R. M. Smith, and others. The most ingenious is from H. V. (American Cast Iron Pipe Co.) Johnson:

$$\frac{8 + 4 \div \frac{9}{3} + 2}{(6 \times 7) + 5 + 1} = \frac{1}{8}$$

If your vacation begins to pall on you you can work up a cerebral sweat with this one sent in by W. C. (Wheeling Steel Corp.) Marshall:

> *Fifteen golf pros play a round robin tournament, each man playing every other, thus giving 14 matches. They play in threesomes, each man playing each of the other two. This gives seven rounds to complete the tournament. In each round there are five threesomes, of course. Numbering the players from 1 to 15, what is the arrangement for each of the 7 rounds? No man is to play any other man more than once. How many different arrangements are possible?*



News of Industry

5 Companies to Build 11 New Blast Furnaces

Washington

• • • **Initial expansion of** pig iron capacity by 6,508,950 tons, an unprecedented rise of about 11.2 per cent over the existing capacity of approximately 58,000,000 tons, approved by OPM, means the equivalent of twenty 1000-ton blast furnaces. At the same time consideration has been given to increasing steelmaking capacity by 15,000,000 tons, or a further boost of 5,000,000 tons over the previously proposed expansion of 10,000,000 tons. Since part of the increase in pig iron capacity is to be achieved by enlarging some furnaces and the rehabilitation of at least three that are now dormant, the number to be built will probably be considerably less than 20.

Of 10 new furnaces proposed the allocation is said to provide for four at plants of the Republic Steel Corp., two at the Indiana Harbor, Ind., plant of the Inland Steel Co., two at plants of the Bethlehem Steel Co., and one each at the Carnegie-Illinois Edgar Thomson Works, Braddock, Pa., and at the plant of the Colorado Fuel & Iron Co., Pueblo, Colo. At Provo, Utah, where Columbia Steel Co., United States Steel Corp., subsidiary, has one blast furnace, will be added three more furnaces. Two of these now idle will be shipped from the Edgar Thomson plant while a third, also dormant will be moved, it is said, from the Carnegie-Illinois plant at Joliet, Ill.

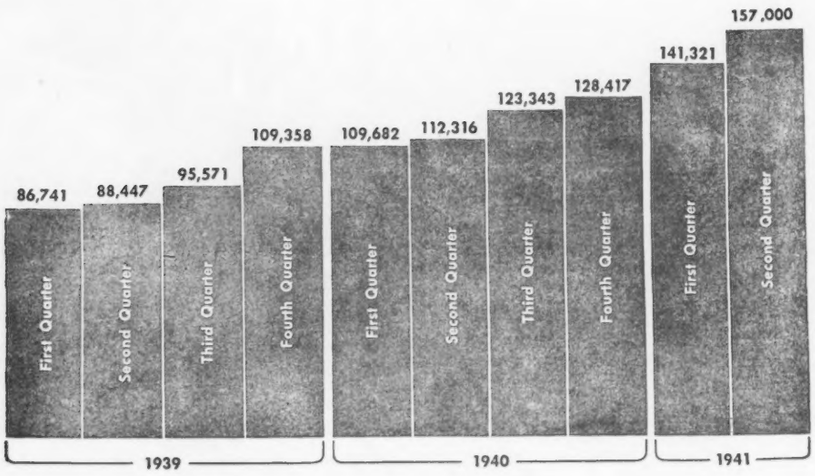
The new furnaces for Republic, it is understood, will consist of one each at Gadsden and Birmingham, Ala., Cleveland and Youngstown, Ohio, while new furnaces for Bethlehem will consist of one each at its Cambria Works, Johnstown, Pa., and at its Lackawanna plant, Lackawanna, N. Y.

Republic now has one blast furnace at Gadsden, two at Birmingham and four each at Cleveland and Youngstown; Inland has five furnaces at Indiana Harbor, Carnegie-Illinois has 9 active furnaces at Braddock; Bethlehem has seven at Johnstown and five at Lackawanna; and Colorado Fuel & Iron Co. has three at Pueblo.

The blast furnace expansion program is estimated to cost between $150,000,000 and $200,000,000. It will be financed by the Defense Plant Corp., RFC subsidiary. Recommendation for government financing was made by OPM Director General William S. Knudsen in a letter to Federal Loan Administrator Jesse H. Jones. Speaking of the OPM-approved blast furnace program as an "initial expansion," the intimation was clear that it may be further expanded, adding to the already serious problem of getting the necessary steel, equipment, and labor, a problem that has been left in the lap of the industry itself rather than being assumed by the government. Mr. Knudsen told Mr. Jones that this "initial expansion" of pig iron capacity was urgently required because present and prospective demand for pig iron was far in excess of capacity and the demand for scrap iron also is in excess of the available supply. The reference to scrap shortage has a direct relation to the pig iron situation. It is intended to use large tonnages of

NEW BLAST FURNACES: The map at the top of this page shows where 10 new blast furnaces are expected to be built. Four stacks are slated to be built by Republic Steel Corp., two by Inland Steel Co., two by Bethlehem Steel Corp., one by Carnegie - Illinois Steel Corp., and one by Colorado Fuel & Iron Corp. Three idle furnaces will be moved and reerected at Provo, Utah, by U. S. Steel Corp.

74,000 Join Bethlehem Payroll



Effect of the defense program on the steel industry is illustrated by this chart of the average number of Bethlehem Steel Corp. employees. Since Jan. 1, 1939, Bethlehem jobs have almost doubled to more than 160,000 (this week). Shipbuilding accounts for part of the increase.

the iron in the bessemer converter to make synthetic scrap. It is claimed this will raise bessemer production to about 9,600,000 tons from 7,000,000 tons annually.

The increased blast furnace capacity will call for an addition of approximately 10,800,000 tons of iron ore to come from the Lake Region, Utah and Alabama. In turn more ore vessels estimated at 15 to 20 will be necessary. The OPM materials coordinating committee has announced that 10 Canadian ships have been made available recently to transport iron ore on the Great Lakes and that additional Canadian vessels would be put into this service shortly. The committee was told that Canada would require an increased amount of steel from the United States in shipbuilding. Pig iron capacity expansion for 1941 is estimated at 2,772,620 tons by Gano Dunn in his recent report on steelmaking capacity. It is said it will require about 18 months to construct the new furnaces OPM wants built, assuming there is no delay in getting steel, labor and equipment, including by-product ovens, blast furnace stoves, blowing engines, etc.

Pig iron expansion shared to a minor degree in the all day meeting the newly set up steel defense advisory committee held with OPM officials, at which Arthur D. Whiteside, chief of the OPM steel section, presided. The chief topic related to both steelmaking and finishing mill expansion. There is said to have been no detailed discussion regarding the further upping of steelmaking capacity by 15,000,000 tons but this figure was considered. Mr. Dunn has estimated that a 10,000,000 ton expansion would require 4,160,000 tons of steel for construction and equipment. On this basis a 15,000,000 ton increase would call for 6,240,000 tons of steel. W. A. Hauck, OPM steel consultant, is quoted as telling the steel advisory committee that steel manufacturers had submitted plans for increasing steelmaking capacity in excess of 10,000,000 tons and that the proposals are being studied.

Considerable discussion also was given to the tightness of the alloy steel situation and the expansion of finishing capacity for this product. The committee was asked to advise OPM regarding possibilities for this expansion. The pressing need for greater sheet and plate production likewise is said to have been discussed.

Coming Events

Sept. 17 to 19—National Industrial Advertisers Conference, Toronto.

Sept. 23 to 26—Association of Iron and Steel Engineers, annual exhibition and meeting, Cleveland.

Sept. 25 to 26—Society of Automotive Engineers, National Tractor Meeting, Milwaukee.

Oct. 1 to 4—Electrochemical Society, Fall Meeting, Chicago.

Oct. 16 to 18—American Society of Tool Engineers, semi-annual meeting, Toronto.

Oct. 20 to 24—National Metal Congress, Philadelphia.

Bethlehem Expansion Nearing Completion

• • • **The program for** increasing Bethlehem Steel Corp.'s open-hearth steel capacity, announced in December in anticipation of the present tremendous demands of the defense industries for steel, is rapidly approaching completion. Part of the new facilities are already in service and by November over three-quarters of a million tons annually will have been added to steel-making capacity by Bethlehem's expansion program.

Two additional open-hearth furnaces at the Bethlehem, Pa., plant are now in service. One of these, with a capacity of 10,000 tons per month, was built in the record time of two months and 24 days from the start of excavation for the foundations. At the Maryland (Sparrow's Point) plant, where the construction of a new building to house the three additional furnaces was necessary, the first new furnace is scheduled for completion about Aug. 1, the second in September and the third in November.

The construction and rebuilding of blast furnaces to support the expanded steel-making capacity is going forward with equal speed. The two furnaces at the Bethle-

hem and Steelton, Pa., plants that were to be rebuilt and enlarged under this program are already in service. The new furnace being built at the Maryland plant is scheduled for completion in August and the new one at the Lackawanna plant is expected to be placed in operation during October. These four furnaces will increase annual pig iron capacity by approximately 780,000 tons.

The new battery of coke ovens at the Lackawanna plant will be in full operation by Aug. 1 and the one at the Maryland plant is expected to be in service by November 1. These two new batteries of ovens will add approximately 785,000 tons annually to coke-making capacity.

Mathieson to Build Second Largest U.S. Magnesium Plant

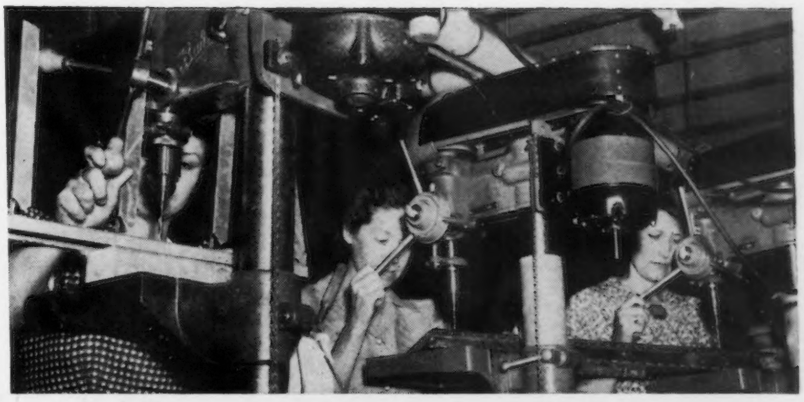
• • • **A new magnesium plant,** which will be the second largest in the United States, will be built by Mathieson Alkali Works at Lake Charles, La., the company has announced. The plant will cost 16 millions and will have an annual capacity of between 15,000 and 20,000 tons of magnesium. This capacity compares with total United States output of 6250 tons in 1940. World production in that year is estimated to have been about 45,000 tons of which about 20,000 tons were produced by Germany.

The capacity of the new plant will equal that of the Dow Chemical unit at Freeport, Texas, it is claimed. Dolomite ore from Burnett, Texas, will provide the raw materials for the Mathieson plant. Financing will be arranged through the Defense Plant Corp.

Ground Broken for Revere Copper Mill

Chicago

• • • **Ground has been broken** for the $10,000,000 rolling mill here to be operated by Revere Copper & Brass, Inc. The plant, which will produce ammunition brass and cartridge cases, is being built by government funds. Certain sections of the factory may be ready by January, 1942, while the entire project is scheduled for complete operations by June of next year.



Photos by International

WOMEN IN INDUSTRY: In replacement of men defense workers by women, the United States still is far behind Britain. At the Frye aircraft school, Long Beach, Cal. (top photo), 29 women recently began a six-weeks course to prepare themselves for jobs in southern California airplane plants. Girl tracers employed by General Electric Co. (center) are attending a 100-hr. course at Rensselaer Polytechnic Institute, Schenectady, N. Y., for women employed in defense industry's drafting rooms. The lower photo shows women students at the Frye school learning to rivet an airplane gas tank.

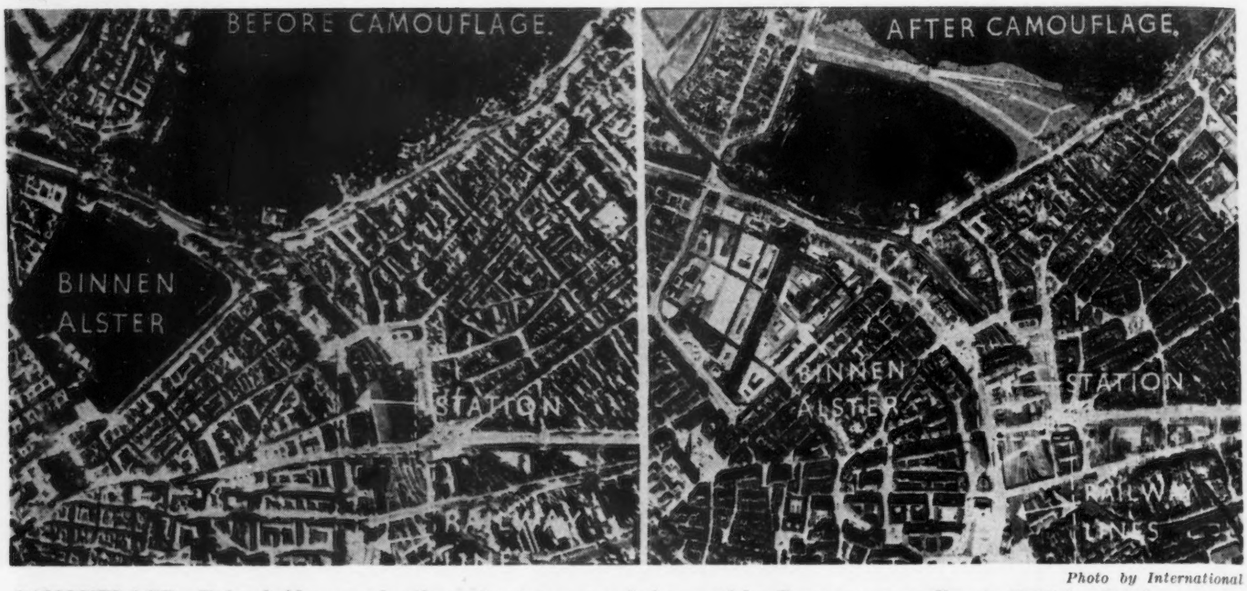


Photo by International

CAMOUFLAGE: Fake bridges and other structures are being used by Germany, according to British officials, to confuse RAF fliers. At the left, according to the British, is an air photograph of Hamburg, Germany, made some months ago by the RAF. Chief landmark for British bombers had been the Binner Alster area, the innermost of the two lakes in the heart of the city. The photo at the right shows how the city now looks from the air. Floating rafts, resembling city blocks, make the Binner Alster appear like a built up area. Even more ingenious is the replica of the Lombarasbruecke bridge, erected 600 yards north of the original.

Concrete Replaces Steel For Los Angeles Gas Holder

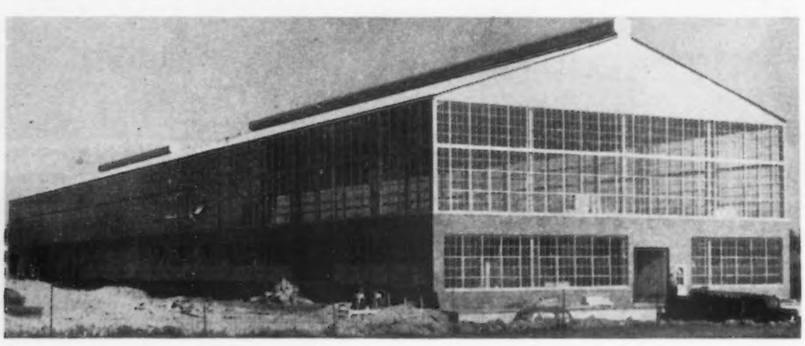
• • • **A concrete pit,** instead of a steel tank, will be used in a 10,000,000 cu. ft. gas holder to be constructed by the Bartlett Hayward division of Koppers Co. for the Southern California Gas Co. at Los Angeles. Defense demand for steel plate resulted in the use of concrete. The gas holder will be 273 ft. in diameter and will rise 190 ft. above the ground. Construction will be speeded due to increased demands for gas by shipyards and aircraft plants.

Illinois TNT Works May Be Expanded

Kankakee, Ill.

• • • **Expansion of the** $50,000,000 Ordnance TNT Works here is said to be under consideration. Army officers here believe if the expansion is approved, it will represent an additional investment of $20,000,000. As now under construction, the project is going up in two units or "areas" each one having TNT processing buildings and power plants. It is believed that an addition would be erected as a third unit along the same lines.

12 MILLION POUNDS A YEAR: Twelve million pounds of aluminum and magnesium castings, largely permanent mold work, can be produced each year in this new modern foundry of the Permold Co. at Medina, Ohio. All casting operations are performed on the second floor of this many-windowed plant to overcome the intense heat created in permanent mold casting. A complete change of air every three minutes is possible, using only natural draft. Close to 90 per cent of Permold's current output is for defense.



24 Illinois Plants Face Early Shutdown

Chicago

• • • **Twenty-four Illinois** manufacturing plants face total shutdown within 90 days unless they can get materials or government contracts. This was learned by the committee for coordination of labor supply and arms training activities in Illinois which is conducting a survey of all plants in the state. Names of the firms were not divulged but it was revealed that they represented such industries as road machinery, oil burners and gas stoves, heating apparatus, overalls, live stock equipment, kitchen utensils, electrical refrigerator units, telephone equipment, clock and watch parts, railway cars, aluminum alloys and castings, stampings, metal plating and lighting fixtures.

Further emphasizing the increasingly critical position of small manufacturers was a report by the Employers' Association of Chicago which showed that companies employing 100 or more workers had experienced an average employment gain in May, 1941, of 8.1 per cent. Companies with less than 100 employees, increased only 1.7 per cent. Labor turnover among the smaller firms was greater.

Defense Plants to Fly Naval Ordnance Flag

• • • Industrial plants which have been outstanding in production of ordnance materiel for the Navy will be awarded Naval Ordnance flags which carry the "crossed Dahlgreen guns and anchor," insignia of the Bureau of Ordnance, Secretary of the Navy Knox announced. (Dahlgreen guns were factor in the superiority of the federal fleets during the Civil War and were used on the Monitor in its battle with the Merrimac.)

One American Producer Of Metallic Calcium

• • • With millions of pounds of scrap aluminum now going through the hands of smelters of secondary aluminum, the availability of metallic calcium is very important. For, by the use of calcium alloying elements in the aluminum, such as tin, bismuth, silicon, antimony, lead, etc., can be eliminated.

Calcium metal was previously imported from France, but now the Electro Metallurgical Co. is producing more than enough for domestic needs at its plant at Sault Ste. Marie, Mich.

The first announcement of this new Electro Metallurgical plant appeared in THE IRON AGE, July 10. In the same issue it was erroneously announced that a new domestic plant to produce metallic calcium had been erected by Charles Hardy, Inc., New York. Charles Hardy is a sales agent for metallic calcium produced in the Sault Ste. Marie plant of the Electro Metallurgical Co.

LeBlond Workers Get Bonus, Week's Vacation

• • • Employees of R. K. LeBlond Machine Tool Co., Cincinnati, were assured of a week's vacation this summer and a vacation bonus of 5 per cent on earnings of each man from December, 1940, to May. Richard E. LeBlond, president of the company, told workers that 2000 working hours each week, enough to double production on gun manufacturing machines, are being lost through layoffs.

Treasury to Organize Non-Military Buying

Washington

• • • The Treasury Department Procurement Division has launched a program to place federal purchasing of non-military items on a planned basis, Director Clifton E. Mach has announced. First step toward establishment of the program was taken more than a month ago after Congress provided funds to establish units for gathering and analyzing data on federal purchasing. At that time, federal departments and agencies, and their field offices, were requested to submit to the division complete data on their purchases. The reports will be submitted monthly.

In announcing the program, Mr. Mack said: "Its long range value lies in the fact that the division will be able to estimate in advance the needs of the government for specific periods. Where possible, the government will place orders during slack seasons to take advantage of better prices. In this way industry and the government will benefit—industry because of elimination of lags in production and no disruption to regular commercial trade. It will enable purchasing officers to regulate orders properly and will give freedom of choice in determining the market in which to buy."

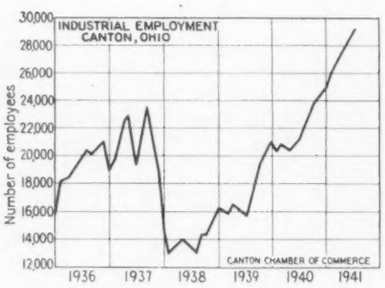
ALUMINUM DUMP: Scenes like this dumping of aluminum in City Hall park, New York, are being repeated in many cities. Civilian Defense Chief La-Guardia's office predicts that the nation wide collection of old aluminum may net from 30 to 40 million pounds, instead of the 20 million originally estimated. *Photo by International*

Sub-Contracts at Canton $50 Million

Canton, Ohio

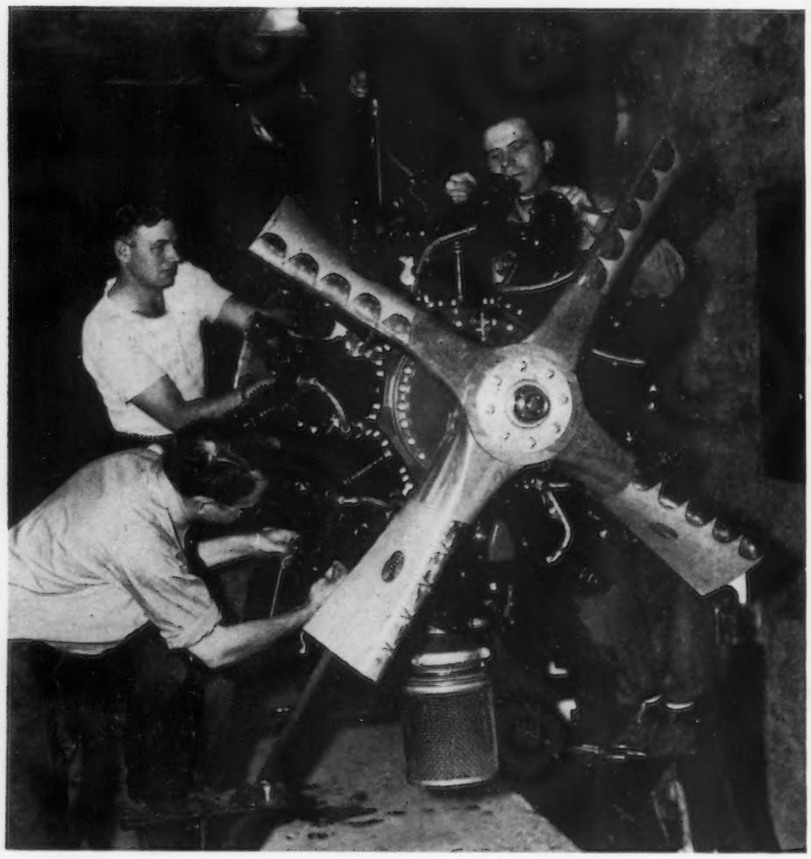
• • • **In Canton and nearby** Massillon, direct contracts of $4,000,000 for ammunition and $250,000 for dental equipment are overshadowed by sub-contracts estimated at $50,000,000 for steel products. Sixty-four per cent of local manufacturing output is now for defense items. A $16,000,000 naval ordnance plant is under construction and $10,000,000 has been spent for private plant expansion. An influx of at least 3000 families during the past year has caused a housing shortage which is gradually being alleviated by both federal and private building.

Canton's industrial employment has doubled during the past two years. The 29,555 persons now employed in Canton factories constitute a new all-time peak of industrial employment by a wide margin and represent a gain of 8400 over one year ago. The new $16,000,000 Naval Ordnance plant, when in full operation, will employ at least 3000 additional skilled workmen, adding nearly $6,000,000 to Canton's annual industrial payroll. Anticipated increases in other Canton factories, according to estimates of governmental agencies, will bring a record employment of 25,000 persons by the end of 1941. Canton's average annual industrial wage is one of the highest in the United States.



DETROIT-BUILT: This 450 hp. Wright engine, to be installed in Chrysler 28-ton tanks, is shown in a test cell at Continental Motor Corp.'s plant. By October, the air-cooled engine will be delivered at the rate of 600 a month.

Photo by Wide World



G-M Defense Output $209 Millions, Orders Total $1.2 Billions

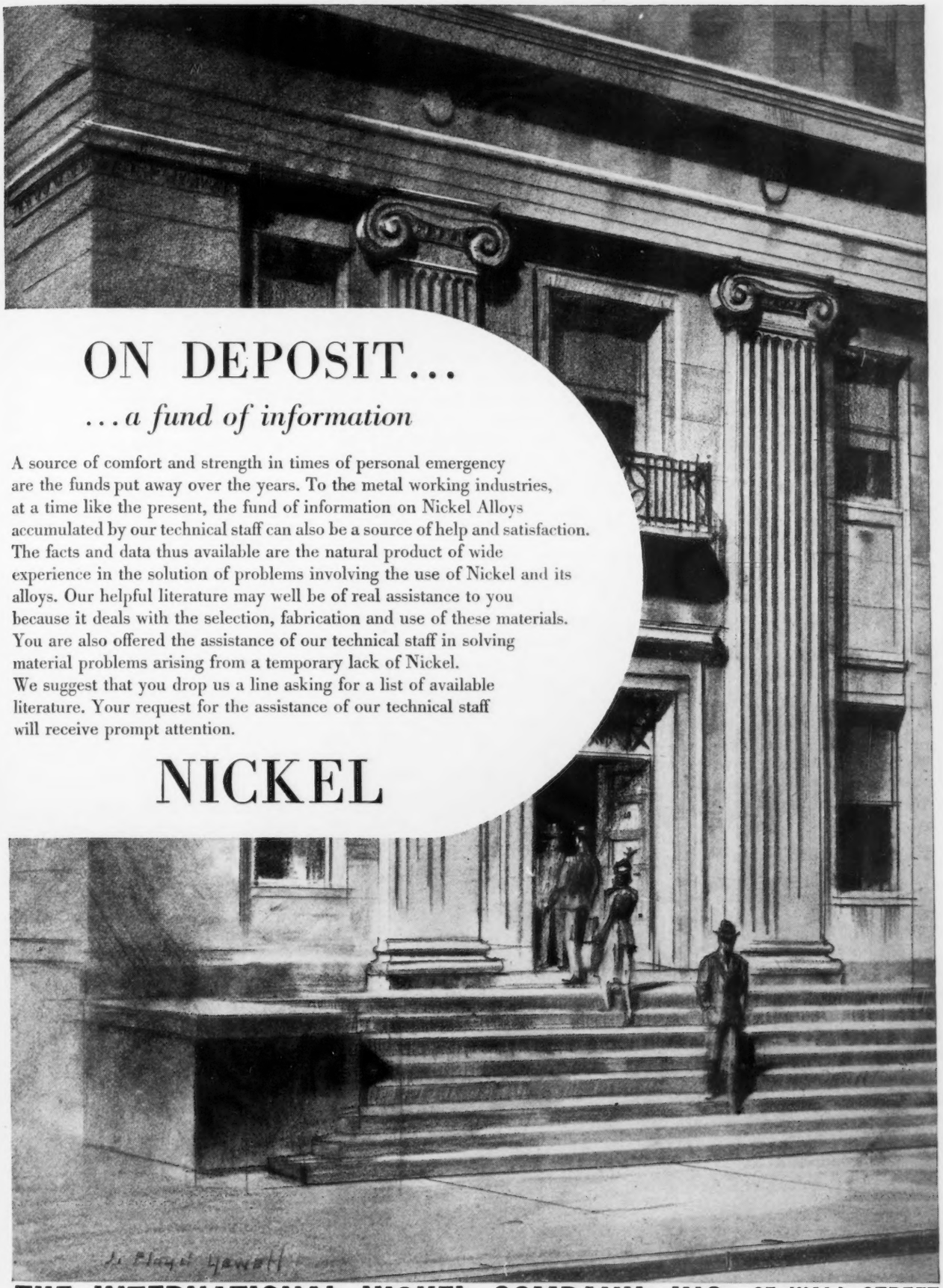
• • • **General Motors Corp.** reports total defense product deliveries to date of $209,500,000, while the aggregate of defense orders assigned to that company or under negotiation now amounts to about $1,200,000,000. Defense deliveries in the second quarter of 1941 totaled $75,200,000, compared with $56,600,000 in the first quarter of this year and $43,700,000 in the fourth period of 1940. A breakdown of deliveries of GM defense products to date (latest available figures) follows:

Established Products Adapted for Defense	
Military trucks and transport equipment	$45,400,000
Diesel engines for naval and military use	48,400,000
Other products	3,900,000
Total established products for defense	$97,700,000
Special Defense Products By GM	
Aircraft engines, aircraft parts and equipment	$60,900,000
Guns, shells and related items	4,800,000
Other products	1,000,000
Total special defense products	$66,700,000
Canada, principally trucks and transport equipment	45,100,000
Total defense deliveries to end of June, 1941	$209,500,000

G-E "Arc Weldrule" Used to Check Electrode Requirements

Schenectady, N. Y.

• • • **Arc Welderule,** developed by General Electric Co., Schenectady, N. Y., is a quick, convenient slide rule arrangement for estimating electrode requirements for specific jobs. Covering 11 different commonly used sizes and types of joints and 22 different sizes and types of popular electrodes in both 14 and 18 in. lengths, the rule reads directly the length of arc welded joints obtainable per 100 lb., of electrode and the weight of weld metal deposited per 100 lb., of electrode. In addition, the vest-pocket size calculator has a selector chart which shows the various filler metal classifications as specified by the American Welding Society and the types of electrodes which meet these classifications. G-E Arc Welding Distributers, Sales Offices, and offices at Schenectady are distributing these Arc Welderules to the trade.



ON DEPOSIT...

...a fund of information

A source of comfort and strength in times of personal emergency are the funds put away over the years. To the metal working industries, at a time like the present, the fund of information on Nickel Alloys accumulated by our technical staff can also be a source of help and satisfaction. The facts and data thus available are the natural product of wide experience in the solution of problems involving the use of Nickel and its alloys. Our helpful literature may well be of real assistance to you because it deals with the selection, fabrication and use of these materials. You are also offered the assistance of our technical staff in solving material problems arising from a temporary lack of Nickel. We suggest that you drop us a line asking for a list of available literature. Your request for the assistance of our technical staff will receive prompt attention.

NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

80% of Link-Belt Business Is for National Defense

• • • **About 80 per cent** of business on hand is of defense character, executives of the Link-Belt Co. were told by Alfred Kauffman, president of the firm, in a meeting here called to discuss plans for increasing production of defense materiel.

Included in the company's preparedness production currently are gun carriages for largest mobile anti-aircraft guns yet planned. The guns will fire shells 4.7 in. diameter to a height of almost 10 miles, having an explosive area of nearly one-half mile. Another Link-Belt product for aerial warfare is a bomber training machine, which gives men preliminary training in bombing while on the ground. Link-Belt is also completely producing 81 mm. trench mortar shells; aluminum burster tubes; amphibian tank equipment for the Marines; turret platforms for medium tanks M-3; equipment for the Army's new Half-Trac Scout Car and the Bantam Scout Car; ammunition stowing and handling chains for the Navy and a host of direct and indirect defense orders for the company's regular products including chains, sprockets, roller bearings, conveyors, power transmission and driving machinery, materials handling, etc.

Westinghouse to Build $22 Million Turbine Plant

• • • **Westinghouse Electric & Mfg. Co.** has completed a lease agreement with the Defense Plant Corp. to build a $22,000,000 plant to manufacture steam turbines and gears for the U. S. Maritime Commission. The new plant, which will adjoin Westinghouse's South Philadelphia Steam Works, will employ 1500 workmen and will make approximately 1,200,000 stainless steel turbine blades a year. It will annually deliver turbines enough to drive 100 ships carrying 1,000,000 tons of cargo.

Indiana Aluminum Plant To Employ 4000

• • • **Almost 4000 will be** employed here in the new addition to the local plant of Aluminum Co. of America when the addition is finished Oct. 1 of this year.

Defense Program Spurs Ohio Plants

Cleveland

• • • **Ammunition contracts** have been more numerous in Northern Ohio recently. Defiance Pressed Steel Corp. at Marion, has booked a contract for 7,500,000 shell cases. Gabriel Mfg. Co., here, plans a new building for shell parts manufacture. Addressograph-Multigraph Corp. is increasing its space for ammunition parts for Great Britain. Electric Vacuum Cleaner Co. holds a contract for 1,500,000 shell fuses. E. W. Bliss Co. will add to its local plant, which ever since the start of the European war has been making shells for the British.

Massillon

• • • **A technical committee** has been appointed here to work with the Chamber of Commerce and to advise on machine shop facilities for the national defense program. Employment here is over the 7000 mark.

Amherst

• • • **U. S. Automatic Corp.** plans the erection of new heat treating facilities in a building about 50 by 200 ft. An adjoining structure formerly housing a cold storage plant has been purchased by U. S. Automatic.

Lima

• • • **Lima Locomotive Works** holds a record volume of contracts, including large orders for steam railroad locomotives and a contract for tanks for Great Britain. The local Westinghouse Electric & Mfg. Co. plant is reported to have received an order for around 8000 rotary volt exchangers for defense program.

Mansfield

• • • **This city is believed** a likely site for a new $3,000,000 defense plant which will be located in Ohio. Defense officers have been touring the State and examining possible locations. Details of the plant's production are closely guarded.

Dura Co. Gets $4,600,000 Gun Belt Link Contract

Toledo, Ohio

• • • **Dura Co., division** of Detroit Harvester Corp., is reported to have been awarded a $4,600,000 contract for machine gun belt links. Present plant facilities are believed ample.

The start of construction on the new American Propeller Corp. plant is believed near. Austin Co., Cleveland, holds the contract for design. Capacity will be aimed at over 3000 propellers per month, instead of the 2000 units originally planned.

Interlake Iron Co. is planning the completion of new sintering equipment late this year at its local blast furnace plant.

Ampco Metal Plant Floor Area Doubled

Milwaukee, Wis.

• • • **Completion of new** foundry which will practically double the present floor area of Ampco Metal, Inc., is near. Total of 60,000 sq. ft. will be added for the production of Ampco copper base alloys and Ampco metal.

Bethlehem Installs Employee Defense Bond Purchase Plan

• • • **An employee savings plan** for purchase of U. S. Defense Bonds was announced this week by E. G. Grace, president of Bethlehem Steel Co. Savings of $1 a week up can be made by payroll deduction.

Motor Vehicle Output Tapers in Canada

Ottawa

• • • **Production of** motor vehicles in Canada for June totaled 25,753 units compared with 26,585 units in May and 17,929 units in June, 1940. The month's output included 8538 passenger cars and 17,215 commercial vehicles. In the six months ending with June, Canada produced 152,871 motor vehicles compared with 110,946 units in the corresponding period last year.

Government Awards . . .

War Dept., Ordnance:

Robert Abel, Inc., Boston; electric hoist crane $1,782

Accurate Tool Co., Newark; punches, supports, holders and screws 18,584

Adirondack Foundries & Steel, Inc., Watervliet, N. Y.; steel castings 2,874

Aerial Machine & Tool Corp., New York; connectors, retaining pins and springs 11,800

Aetna Standard Engineering Co., Youngstown, Ohio; pilot chassis 11,686

Ahlberg Bearing Co., Chicago; bearings, parts for tanks, and tanks 22,886

Aircraft, Inc., Santa Monica, Cal.; shells 730,800

Ajax Electric Co., Philadelphia; bath furnace 3,127

Albany Hardware & Iron Co., Albany, N. Y.; taps, gun 1,918

All Tool Co., Hillside, N. J.; supports, punch guide holders, and punch guides 4,800
gages 1,948

Allegheny Forging Co., Pittsburgh; forged steel; steel discs, axles and rims 9,687

Allegheny Ludlum Steel Corp., Dunkirk, N. Y.; steel 1,966

Allis-Chalmers Mfg. Co., Milwaukee; gasoline operated tractors and services to install trail-builders 34,050

American Brass Co., Waterbury, Conn.; bands, hard seamless ... 3,351
bronze, aluminum 2,722
brass rod 6,487

American Can Co., Maywood, Ill.; cans 3,250

American Car & Foundry Co., Berwick, Pa.; tanks and parts 14,371,812
armor plate 1,090,000

American Locomotive Co., New York; parts for tanks 1,419,270
helical springs 8,625

American Machine & Metals, Inc., East Moline, Ill.; machine, hydraulic testing 4,465

American Petrometal Corp., Long Island City, N. Y.; steel, bar, carbon 1,609

American Spring & Wire Specialty Co., Chicago; springs 3,569

American Steel & Wire Co. of N. J., New York; nails, sinkers, cement coates 7,057
coil spring work 3,040

Armstrong Brothers Tool Co., Chicago; wrenches 1,917

Arter Grinding Machine Co., Worcester; grinders 4,525

Athey Truss Wheel Co., Chicago; trailers 131,300

Autocar Co., Ardmore, Pa.; carriers, half track 4,519,531

Auto-Ordnance Corp., Bridgeport, Conn.; machine guns and parts 12,050

Barber-Colman Co., Machine & Small Tools Division, Rockford, Ill.; machines, milling 6,224
cutters and keys 2,338

Barker Tool Die & Gauge Co., Detroit; gages 7,472

W. F. and John Barnes Co., Rockford, Ill.; machines, boring, drilling and counter-boring 22,346

Barwood & Co., Philadelphia; parallels, blocks, irons and wires 2,226

Bauer Machinery Co., for mfr. at Midway Machine Co., St. Paul; milling machine 1,857

Bearings Co. of America, Lancaster, Pa.; bearings 4,567

Beaver Machine & Die Casting Corp., Syracuse, N. Y.; gages .. 1,711

Bendix Aviation Corp., Bendix Products Division, South Bend, Ind.; charger cylinder assembly and parts 281,892
pilot turret assemblies 22,500

Bendix Aviation Corp., Scintilla Magneto Division, Sidney, N. Y.; parts and equipment for tanks. 3,280
parts for tanks 8,247

Bethlehem Steel Co., Bethlehem, Pa.; blocks, guard rail; bolts, track, switch plates and spikes. 3,103
rail, steel, and bars, splice 6,597

Blanchard Machine Co., Cambridge, Mass.; grinders 7,374

Blood Bros. Machine Co., Division of Standard Steel Spring Co., Allegan, Mich.; universal joints, steel 1,668

Bohn Aluminum & Brass Corp., Michigan Smelting & Refining Division, Detroit; manganese bronze 3,150

Bonney Forge & Tool Works, Allentown, Pa.; wrenches 8,100
forgings 2,211

Breeze Corporation, Inc., Newark; parts for tanks 110,237

Bridgeport Brass and Copper Co., Bridgeport, Conn.; discs, brass. 59,920

Roy L. Brower Corp., New York; nails, sinkers, cement coates .. 2,685

Brown-Lipe Gear Co., General Drop Forge Division, Buffalo; forgings 2,064

Brown & Sharpe Mfg. Co., Providence; milling and grinding machines 13,842
machine, hand screw 3,242
gages 12,026

Brunswick - Balke - Collender Co., Muskegon, Mich.; chests, misc.. 2,832

Buckeye Traction Ditcher Co., Findlay, Ohio; transmissions 2,348,000

Bucyrus-Erie Co., South Milwaukee; pilot carriage and recoil mechanism 135,000
gun carriages 2,807,900

E. G. Budd Mfg. Co., Philadelphia; shells 1,507,872

Budd Wheel Co., Detroit; auto disc & rim wheels 7,320

H. W. Butterworth & Sons, Philadelphia; mount, tripod 3,003,000

Carboloy Co., Detroit; bullet cores and caps 5,100

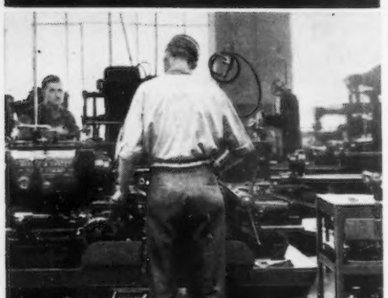
G. O. Carlson, Inc., Pittsburgh; steel, stainless 10,137

Carnegie-Illinois Steel Corp., Boston; steel, bar, nickel 2,402
steel, chrome, nickel 1,877

PIT RIVER BRIDGE: This picture shows the progress of steel erection on the great double deck bridge which will carry railroad trains and highway traffic across Shasta Reservoir of the Central Valley project. The concrete pier in the foreground is 360 ft. high. The three main spans now total 920 ft., or about one fourth of the completed bridge.

ASE

SHOP EQUIPMENT



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ALL-STEEL-EQUIP COMPANY, Inc.
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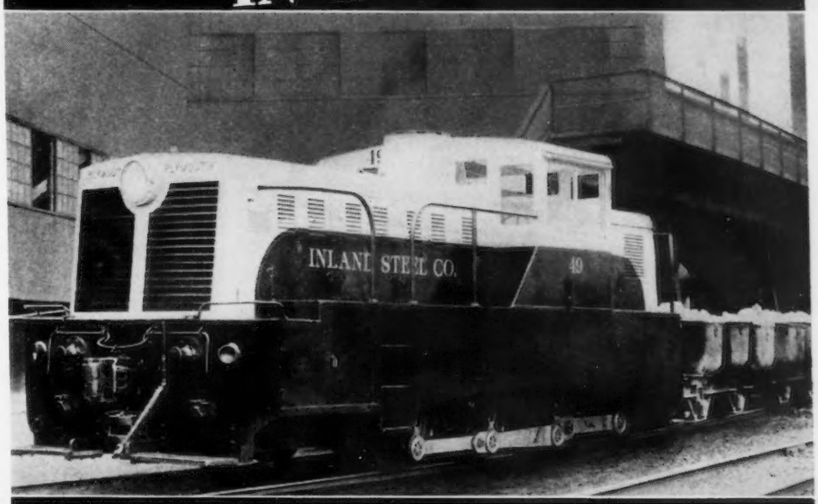
AURORA • ILLINOIS

Carpenter Steel Co., Reading, Pa.; steel, tool 8,865
Central Steel Tube Co., Inc., Clinton, Iowa; mount, tripod 746,502
Chambersburg Engineering Co., Chambersburg, Pa.; hammers .. 67,280
Chase Brass & Copper Co., Waterbury, Conn.; cartridge cases ... 1,484,625
Chase Metal Works Plant, Waterville, Conn.; bands, seamless .. 8,543
rods, brass 118,028
Chicago Flexible Shaft Co., Chicago; fuzes 573,844
Chicago Rawhide Mfg. Co., Chicago; oil retainers 4,263
Chicago Screw Co., Chicago; nickel steel 1,923
Chisholm-Ryder Co., Niagara Falls, N. Y.; boxes, ammunition 768,750
Chrysler Corp., Detroit; tanks and parts 74,567,761
Cincinnati Milling Machine Co., Cincinnati; grinders, tools and cutters 1,931
Circle Wire & Cable Corp., Long Island City, N. Y.; lead encased cable 3,920
Clearing Machine Corp., Chicago; dials and bushings 3,400
Cleaver-Brooks Co., Milwaukee; boilers, steam and equipment .. 31,446
Cleveland Container Co., Cleveland; carriers, ammunition 633,500
Cleveland Cutter & Reamer Co., Cleveland; tools 9,540
Cleveland Tractor Co., Cleveland; parts for tractors 1,500
Colt's Patent Fire Arms Mfg. Co., Hartford; depressors and rods.. 14,683
small arms materiel 1,079,074
Comtor Co., Waltham, Mass.; gages, inspection 2,607
Conmar Products Corp., Newark; gages 11,669
Consolidated Steel Warehouse Co., Philadelphia; steel, bar 9,791
Continental Machines, Inc., Minneapolis; band saw and file cutting-off machine 2,210
Continental Motors Corp., Muskegon, Mich.; nuts, valves and rocker assemblies 3,719
assemblies, cylinder and head .. 51,007
parts for tanks 168,038
exhaust pipe flanges 2,520
engines 3,921,651
gages 2,876
Continental Roll & Steel Foundry Co., Coraopolis, Pa.; bodies, bomb 41,900
castings 3,252,600
Conveyor Engineering & Supplies Corp., Clifton, N. J.; conveyors 2,886
Crescent Electric Supply Co., Davenport, Iowa; pressure water coolers 2,230
Crown Cork & Seal Co., Baltimore; mount, tripod 2,713,926
Crucible Steel Co. of America, New York; steel nickel-chromium 1,775
rods, drill 5,662
steel 4,594
Cummings Machine Works, Boston; pedestal for design division 20,962
Cutter, Wood & Sanderson Co., Cambridge, Mass.; carriage bolts, nuts and screws 2,614
Davenport Machine Co., Rochester, N. Y.; collets, grinders, lathes, milling & drilling machines & shapers 1,650
Denison Engineering Co., Columbus, Ohio; hydraulic presses ... 14,948
Detroit Seamless Steel Tube Co., Dearborn, Mich.; steel 5,805
Detroit Tap & Tool Co., Detroit; gages 1,783
Diamond T Motor Car Co., Chicago; carriers and parts 4,498,706
Duplex Mfg. Corp., Sherman, N. Y.; steel chests 3,271
Duro Metal Products Co., Chicago; wrench sockets 1,704
Edgemoor Iron Works, Inc., Edgemoor, Del.; shells 7,031,000
Edgewater Steel Co., Pittsburgh; forgings, nickel steel 4,556
forgings, alloy steel 17,364
Electric Vacuum Cleaner Co., Cleveland; fuzes 1,438,500
Electrical Motors, Inc., U. S., Milford, Conn.; electric motors ... 7,135
Ex-Cello Corp., Detroit; grinders. 1,590
broaches, tools 8,163
machines 1,615
Executone System, Philadelphia; systems, intercommunication ... 1,514
Falstrom Company, Passaic, N. J.; hoods, exhaust and piping 2,250
Faultless Caster Corp., Evansville, Ind.; fuzes 552,500
Federal Machinery Sales Co., Chicago; presses 1,959
Federal Products Corp., Providence; gages 4,200
Federal Tool Corp., Chicago; gages 29,821
Felt & Tarrant Mfg. Co., Chicago; comptometers 1,580
Fidelity Machine Co., Philadelphia; finishing machine 1,755
Firestone Tire & Rubber Co., Akron, Ohio; gun carriages 37,922,560
Firth-Sterling Steel Co., McKeesport, Pa.; blanks, carbide for tool tips 1,620
dies 2,150
Foote-Burt Co., Cleveland; machines 12,729
Fort Pitt Bedding Co., Pittsburgh; metallic belt links 720,000
General Industries, Inc., Elyria, Ohio; fuzes 925,000
General Motors Corp., Detroit; engines, diesel 1,137,800
General Motors Corp., Cadillac Motor Division, Detroit; engines .. 33,200
General Motors Corp., Delco Brake Division, Dayton, Ohio; boosters, metal parts 1,290,000

FURIOUS: Above is a recent photograph of the British aircraft carrier "Furious." *Photo by Wide World*

General Motors Corp., Delco Products Division, Dayton, Ohio; shells 924,260
General Motors Sales Corp., Hyatt Bearings Division, Harrison, N. J.; bearings 6,622
General Railway Signal Co., Rochester, N. Y.; shells 28,650
General Steel Castings Corp., Eddystone, Pa.; castings 3,450,000
G. M. Gibson Co., Bellevue, Iowa; chests 17,450
fillers 12,250
Gilbert & Barker Mfg. Co., West Springfield, Mass.; water jackets 523,792
Gisholt Machine Co., Newark; lathes 47,222
Gleason Works, Rochester, N. Y.; gear testing machines 5,350
machines 22,720
Globe Machine & Stamping Co., Cleveland; cartridge cases 1,137,500
Gold Seal Electric Supply Co., Buffalo; transformers 3,271
Grapho Products, Inc., Indianapolis; shells 947,260
Greenfield Tap & Die Corp., Greenfield, Mass.; gages 52,407
Gries Reproducer Corp., New York; gages 4,031
Guiberson Diesel Engine Co., Chicago; parts for tanks 296,193
engines 5,314,171
Hadley Special Tool Co., Inc., Boston; tools, carbon removing ... 7,150
Hajoca Corp., Philadelphia; pipe parts & plumbing supplies 2,879
Hannifin Mfg. Co., Chicago; recoil mechanisms and equilibrators 1,855,000
Hanson-Whitney Machine, Hartford; taps 2,523
Louis Hanssen's Sons, Davenport, Iowa; cross-cut saws 2,436
Hardinge Brothers, Inc., Elmira, N. Y.; lathes 2,713
Hardinge Mfg. Co. Division Elgin Tool Works, Chicago; optical glass polishing machines 74,025
Hartford Electric Steel Corp., Roxbury, Mass.; steel castings 2,881
Hawkridge Bros. Co., Boston; steel, bar, carbon 1,549
Hesse Machine & Mfg. Co., Boston; gages 41,298
A. F. Holden Co., New Haven, Conn.; electric furnaces 8,397
Hoover Co., North Canton, Ohio; fuzes 1,086,400
Index Machine & Tool Co., Jackson, Mich.; machines, milling .. 9,344
Indianapolis Drop Forging Co., Indianapolis; shot 1,800,500
Ingersoll-Rand Co., Chicago; portable air compressor 2,650
International Business Machine Corp., Washington; machines .. 10,850
International Harvester Co., Chicago; boosters, adapter 128,400
tractors 2,129,098
International Silver Co., Meriden, Conn.; rifle clips 483,898
Interstate Plumbing Supply Co., Albany, N. Y.; pipe steel & wrought iron 2,105
Ithaca Gun Co., Inc., Ithaca, N. Y.; small arms materiel 52,582
Byron Jackson Co., Los Angeles; recoil mechanisms 1,395,000
Jahn Mfg. Co., New Britain, Conn.; gages 1,829
C. R. Jahn Co., Chicago; trailers. 8,952
Johnson Claflin Corp., Marlboro, Mass.; gages 6,217
R. A. Jones and Co., Covington, Ky.; machine, detonator loading 15,000
Jones & Lamson Machine Co., Springfield, Vt.; grinding machines 38,951
comparator 3,170
Jones & Laughlin Steel Corp., Pittsburgh; steel, cold drawn .. 73,080
Jones & Laughlin Steel Corp., Gilmore Wire Rope Div., Pittsburgh; steel cables 15,312

Flexomotives DELIVER A FULL MEASURE OF PROFITABLE PERFORMANCE—
IN EVERY YARD



MEASURE LOCOMOTIVE PERFORMANCE BY THE Flexomotive YARDSTICK!

In every industrial yard—steel plant—wherever Flexomotives are at work moving materials quickly, economically and in volume, new comparison standards are being set for industrial locomotive track haulage.

By any practical yardstick, Plymouth Flexomotives *earn* consideration whenever and wherever tonnage, speed and cost requirements call for industrial locomotive power. It will pay you to give them that consideration.

PLYMOUTH LOCOMOTIVE WORKS
Division Of THE FATE-ROOT-HEATH COMPANY,
PLYMOUTH, OHIO

FLEXOMOTIVES ARE FIRST IN—

ECONOMY
20% less fuel; lowest maintenance cost ever recorded for full powered locomotive.

POWER
Outpull any other diesel of equal size and horsepower; Plymouth 45-ton Flexomotive outpulled a 65-ton steamer on same job.

EFFICIENCY
From 83% to 88% average over entire speed range.

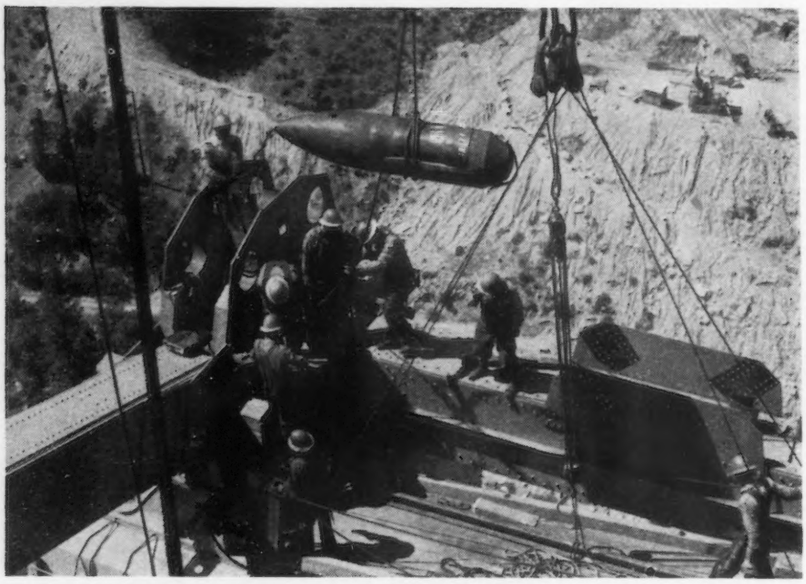
AVAILABILITY
95% to 97% availability in 24 hour service.

FLEXIBILITY
Instant variation of speeds to meet a wide range of work requirements and conditions. Finger-tip control.

RUGGEDNESS
Most ruggedly built internal combustion locomotive in America.

Write for This Outstanding Performance Record—factual evidence charting Plymouth Flexomotive performance in more than 35,000 hours of continuous operation is yours for the asking. Write for it!

PLYMOUTH Flexomotive
DOLLAR FOR DOLLAR
THE GREATEST DIESEL LOCOMOTIVE EVER BUILT



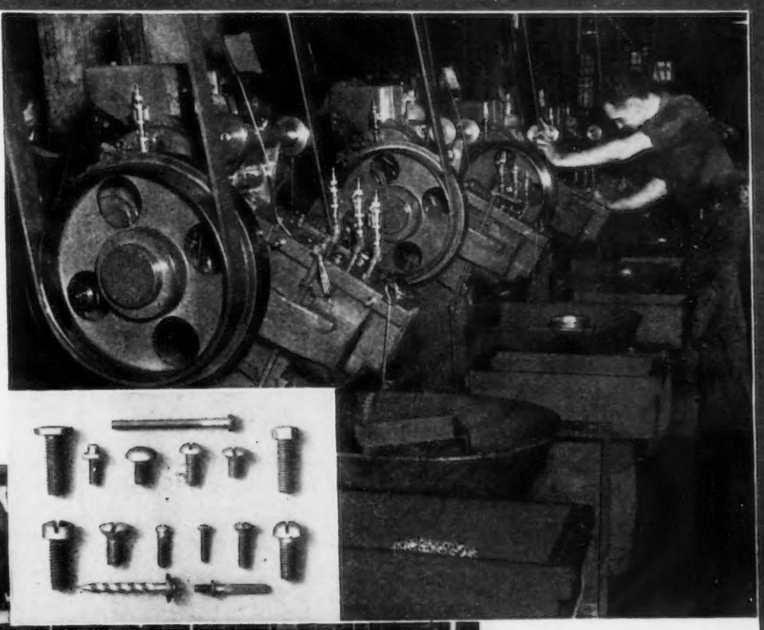
NOT A TORPEDO: As much as it looks like a projectile, the bullet-shaped gadget shown above is not explosive. It is a forged steel pin (22 in. in diameter, 8 ft. long) used to help hold together two spans of the Pit River bridge being built over a future arm of the Shasta reservoir by the U. S. Bureau of Reclamation.

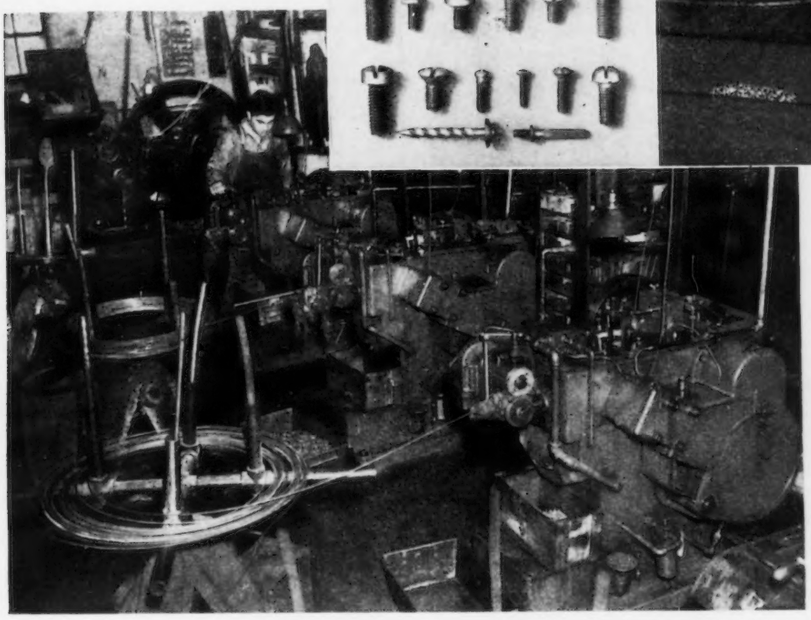
Kearney & Trecker Corp., West Allis, Wis.; milling machines .. 43,156
Kelsey-Hayes Wheel Co., Plymouth, Mich.; small arms materiel 24,334,286
Kent Aircraft Machine Tool Co., Camden, N. J.; gages 29,768
Kerlow Steel Flooring Co., Jersey City; angles 2,547
Walter Kidde & Co., Inc., New York; fire extinguishers 11,630
Kramer Trenton Co., Trenton, N. J.; cartridge cases 595,720
Landis Machine Co., Waynesboro, Pa.; threading machines and equipment 3,499
grinders 13,197
La Salle Steel Co., Hammond, Ind.; steel, cold drawn 156,600
Latrobe Electric Steel Co., Latrobe, Pa.; steel, high speed 1,594
R. K. LeBlond Machine Tool Co., Cincinnati; lathes 227,225
Leeds & Northrup, Philadelphia; furnace and accessory equipment 3,766
Leidy Electric Co., Phillipsburg, N. J.; cable and wire 3,989
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages ... 7,570
Lincoln Tool and Die Co., Detroit; fixtures 2,784
Lindberg Engineering Co., Chicago; furnaces 3,103
Linde Air Products Co., New York; nitrogen valves 3,800
Lloyd & Arms Machine Co., Philadelphia; lathes 24,061
Long Beach Machine Works, Houston; lathes 420,480
Mack International Motor Truck Corp., Albany, N. Y.; tractor and trailer 11,200
Mack Mfg. Corp., Long Island City, N. Y.; tank assemblies 6,419,481
Maclane Hardware Co., New York; oilers 3,249
Marburg Bros., Inc., New York; borers and grinders 23,650
J. P. Marsh Corp., Chicago; gages 2,504
Mattison Machine Works, Rockford, Ill.; grinders 73,228
McCord Radiator & Mfg. Co., Detroit; helmet liners & suspension & helmet bodies 3,215,370
McGill Mfg. Co., Valparaiso, Ind.; bearings 10,238
McKiernan-Terry Corp., Dover, N. J.; machines, staking, pneumatic 2,715
Mereen-Johnson Machine Co., N. Minneapolis; automatic machine 2,705
Midvale Co., Nicetown, Philadelphia; billet, steel 2,415
Midwestern Tool Co., Chicago; gages 9,279
H. W. Mills & Co., Paterson, N. J.; screws 4,891
Minster Machine Co., Minster, Ohio; press 4,954
Modern Tool & Die Co., Philadelphia; gages 62,286
Morse Twist Drill and Machine Co., New Bedford, Mass.; cutters and saws 1,520
Motor Tool Mfg. Co., Detroit; gages 1,714
Mueller Brass Co., Port Huron, Mich.; heads, primer, for percussion primers 19,519
Mullins Mfg. Co., Warren, Ohio; cartridge cases 2,311,944
Multi-Products Tool Co., Newark; fixtures, shanks, spreaders, sliders, punches, etc. 2,000
A. F. Murphy Die & Machine Co., Boston; slides 11,460
National Stamping Co., Detroit; links, metallic belt 2,665,900
National Wire & Cable Co., Pittsburgh; cable & wire 8,419
Nicholson File Co., Anderson, Ind.; files 5,019
Niles-Bement-Pond Co., Pratt and Whitney Division, West Hartford, Conn.; machines 31,216
rifling, chambering, and drilling machines 95,001
blocks and gages 14,464
taps 2,092
lathes 23,796
Norris Stamping & Mfg. Co., Los Angeles; cartridge cases 1,935,200
Norton Company, Worcester, Mass.; grinding wheels 1,804
grinders 10,938
Oilgear Co., Milwaukee; parts for tanks 2,105,469
Otis Steel Co., Cleveland; sheets.. 2,236
Palnut Co., Irvington, N. J.; palnuts 1,721
Parent Metal Products, Inc., Philadelphia; install metal doors on storage cabinets, wire & metal partitions & metal tables 3,500
Penn Instrument Works, Inc., Philadelphia; gages 6,155
Pennsylvania Tool & Mfg. Co., York, Pa.; gages 23,720
Pettibone Mulliken Co., Chicago; gun carriages 1,846,000
Phosphor Bronze Smelting Co., Philadelphia; phosphor bronze.. 1,632
bronze 1,883
J. J. Pocock, Inc., Philadelphia; refrigeration and water cooling equipment 1,667
Poor and Co., Canton Forge & Axle Works, Canton, Ohio; forgings 6,682
H. K. Porter Co., Inc., Pittsburgh; locomotive, narrow-gauge 5,125
Precise Tool & Mfg. Co., Farmington, Mich.; templates and flush pins 3,588
gages 58,527
Precision Mfg. Co., Philadelphia; ammunition testing equipment.. 4,200
gages 9,750
Henry Prentiss and Co., New York; drilling machines 2,387
grinders 13,210
machines 23,783
Purolator Products, Inc., Newark; fuel filters 3,512
Quality Aluminum Casting Co., Waukesha, Wis.; aluminum castings 4,283
Quality Tool & Die Co., Indianapolis; gages 21,554
Rahaim Machine & Tool Co., Boston; gages 4,023
W. B. Rapp, Beverly, Mass.; grinders 6,417
Arthur Rehberger & Son, Inc., Newark; buggies 3,010
Remington Arms Co., Inc., Findlay, Ohio; skeet outfits 10,713
Republic Steel Corp., Cleveland; armor plate 5,423,000
pig iron 3,427
steel bar, carbon 2,873
Republic Steel Corp., Union Drawn Steel Division, Massillon, Ohio; steel, cold drawn 62,640
Revere Copper & Brass, Inc., Rome, N. Y.; cups, brass 11,151,950
discs, brass 199,903
Revolvator Co., North Bergen, N. J.; electric elevator 2,565
Reynolds Metal Co., Louisville, Ky.; powder, aluminum 2,150
Riverside Metal Co., Riverside, N. J.; brass cartridge discs 507,017
Robertshaw Thermostat Co., Youngwood, Pa.; boosters, metal parts 112,077
Rock Island Metal Foundry, Rock Island, Ill.; castings 42,788
Rockford Machine Tool Co., Rockford, Ill.; shapers 7,761
Rockwood Sprinkler Co., Boston; sprinkler systems 16,034
Roessler Machine Co., Elkins Park, Pa.; tools 7,296
SKF Industries, Inc., Philadelphia; bearings 11,910
Sager-Spuck Supply Co., Inc., Albany, N. Y.; track scale 2,822
wrenches 3,328
Sargent & Co., New Haven, Conn.; fuzes 2,319,660
Schutte and Koerting Co., Philadelphia; barrels, washing 5,692
Schwitzer-Cummins Co., Indianapolis; cartridge cases 526,320

Machine Screws

By the million

Each machine in this battery of Waterbury-Farrel Automatic Screw Thread Rollers will do more than 1,000,000 No. 10 machine screws a month. Automatic Threaders up to and including ¾" thread diameter; Hand Feed Machines up to and including 1".





The last word in high speed cold heading—a group of Waterbury-Farrel "Hi-Pro" double blow headers. Production: For 3/16" wire, 225 per min.; for 5/16" wire, 175 per min.

Produced on WATERBURY-FARREL COLD PROCESS SCREW MACHINERY *at the* CENTRAL SCREW CO., PLANT

FOUNDED WATERBURY FARREL 1851

The name "Waterbury-Farrel" occupies a prominent place in the Metal Working Machinery field. One of this company's best-known products is Cold Process Machinery used in the manufacture of bolts, screws, rivets, nuts and many special parts which are capable of being upset, threaded, or otherwise fabricated from cold drawn wire.

If you have a manufacturing problem of this nature, or in fact, any metal products problem, why not solicit help from Waterbury-Farrel?

WATERBURY FARREL FOUNDRY & MACHINE COMPANY

WATERBURY • CONNECTICUT • U·S·A

CHICAGO CLEVELAND NEWARK, N. J.

GUSHER COOLANT PUMP

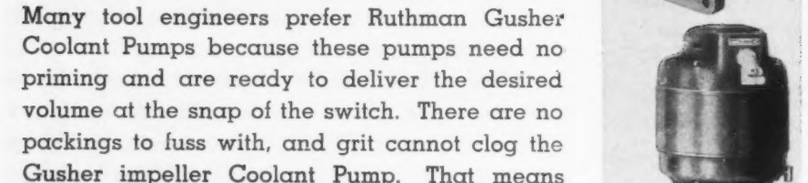
Every Tool Engineer Recognizes

Every tool engineer recognizes the coolant pump as an important part of his tooling-up plans.

Many tool engineers prefer Ruthman Gusher Coolant Pumps because these pumps need no priming and are ready to deliver the desired volume at the snap of the switch. There are no packings to fuss with, and grit cannot clog the Gusher impeller Coolant Pump. That means there will be no interruption in production so far as coolant supply is concerned.

The RUTHMAN Machinery Company

1821 READING ROAD, CINCINNATI, OHIO, U. S. A.



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT

Scovill Mfg. Co., Waterbury, Conn.; cartridge cases and boosters ..	8,048,442
primers, fuze	50,375
Scullin Steel Co., St. Louis; bomb materiel	1,485,000
Seamless Products Co., Inc., New York; cans, misc.	38,250
Seng Co., Chicago; links and assemblies	2,952
Servel, Inc., Evansville, Ind.; cartridge cases	561,600
Seymour Mfg. Co., Seymour, Conn.; bronze	2,456
Shakeproof Lock Washer Co., Chicago; washers, lock	1,643
Sheet Metal Products, Inc., Newark; hoppers, elevator	15,648
Sheffield Corp., Dayton, Ohio; gages	22,185
W. E. Shipley Machinery Co., Cincinnati; grinding machines	37,719
Simonds Saw & Steel Co., Boston; blades, hack saw	2,093
Simplex Wire & Cable Corp., Cambridge, Mass.; cable & reels ..	6,140
Sinko Tool & Mfg. Co., Chicago; gages	1,840
Singer Mfg. Co., New York; directors	3,432,000
A. O. Smith Corp., Milwaukee; bomb bodies with drawings and specifications	81,000
H. A. Smith Machinery Co., Syracuse, N. Y.; lathes	43,122
South Bend Lathe Works, So. Bend, Ind.; lathes	2,531
Southern States Equipment Corp., Birmingham, Ala.; boosters	561,370
Standard Gage Co., Inc., Poughkeepsie, N. Y.; gages	5,806
Standard-Knapp Corp., New York; machine, carton packing	3,310
Standard Pressed Steel Co., Jenkintown, Pa.; steel benches; tool room shelving; tool stands; and lockers	4,274
nuts, steel	16,390
screws	2,621
Stanley Works, New Britain, Conn.; rifle clips	487,986
F. J. Stokes Machine Co., Philadelphia; tablet machine with hopper and motor drive	2,989
Strong Steel Foundry Co., Buffalo; castings, steel	1,880
Sullivan Machinery Co., Michigan City, Ind.; air compressor	48,544
Swind Machinery Co., Philadelphia; drills, lathes, grinder and milling machine	19,916
presses	1,562
Taft Peirce Mfg. Co., Woonsocket, R. I.; gages	17,988
grinders	6,419
Templeton, Kenly & Co., Chicago; jacks	16,500
Thomson-Gibb Electric Welding Co., Lynn, Mass.; parts for welding machine	3,167
Thorrez & Maes Mfr. Co., Jackson, Mich.; assembly for bombs	131,502
Thurston Mfg. Co., Providence; end mills	1,900
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis.; bearings for chests, etc.	7,125
Titeflex Metal Hose Co., Newark; parts for tanks	3,160
Tools & Gages, Inc., Cleveland; gages	25,204
Topping Brothers, New York; bases, jacks, bar levers, chains, sky hooks	27,330
Trackson Co., Milwaukee; truck mounts	942,114
Triad Tool and Die Co., Newark; pins, staking pins, holders and punches	10,212
Tri-Metal Products Co., Conshohocken, Pa.; castings, bronze ..	6,361
True Alloys, Inc., Detroit; castings	6,007
Tungsten Electric Corp., Union City, N. J.; carbide tipped turning tools and carbide blanks ...	22,500
Theodore Ulmer Co., Inc., Worcester; grinding machines	7,494
Union Twist Drill Co., Athol, Mass.; tools, cutting	1,852

University of Virginia, Charlottesville, Va.; development and construction of ultra-centrifuge machine 5,000
Utica Drop Forge and Tool Corp., Utica, N. Y.; wrenches 1,845
Uxhtorff Co., Davenport, Iowa; hangers, mortar; and hangers, ammunition 9,830
Vandyck Churchill Co., Springfield, Mass.; milling machine 6,909
Vickers, Inc., Waterbury Tool Division, Waterbury, Conn.; gears.. 267,684
Vilter Mfg. Co., Milwaukee; guns 1,446,518
Vinco Corp., Detroit; plugs, snaps, pins and templates 1,810
gages 7,112
Vulcan Mold and Iron Co., Latrobe, Pa.; molds, cast iron 5,694
Wadell Engineering Co., Newark; tools 21,224
Walker Manufacturing Co. of Wisconsin, Racine, Wis.; hoists, automobile 5,400
Waltham Machine Works, Waltham, Mass.; thread miller 1,958
Ward La France Truck Corp., Elmira, N. Y.; trucks, heavy wrecking 1,658,519
Warner & Swasey Co., Cleveland; lathes 6,713
Warren Foundry & Pipe Co., Phillipsburg, N. J.; pipe 4,535
Waterbury Farrel Foundry Machine Co., Waterbury, Conn.; machines 5,445
Frank M. Weaver & Co., Inc., Lansdale, Pa.; erection of steel gallery 6,583
Webster Tallmadge Co., New York; system heating 3,591
Weldon Tool Co., Cleveland; tools 2,750
Wellman Bronze & Aluminum Co., Cleveland; castings 5,533
West & Dodge Thread Gage Co., Inc., Boston; gages 4,735
Western Cartridge Co., East Alton, Ill.; cartridges 68,388
Westinghouse Electric & Mfg. Co., Springfield, Mass.; oil gears .. 710,133
White Motor Co., Cleveland; carriers, half track 5,476,926
Whitman & Barnes, Detroit; drills 3,615
Wiedemann Machine Co., Philadelphia; gages 16,864
Wilson Bros. Co., New York; drilling machines 13,733
Wilson-Brown Co., Rockford, Ill.; drilling machines 6,972
Winchester Repeating Arms Co., New Haven, Conn.; ignition cartridges 14,625
shotguns and attachments 36,336
John Wood Mfg. Co., Inc., Muskegon, Mich.; springs, rods, stems, boxes, etc. 51,111
Worthington Pump & Machinery Corp., Holyoke, Mass.; compressors, air 3,876
Wright Aeronautical Corp., Paterson, N. J.; assemblies, manifold, exhaust; assemblies, harness, wiring 2,657
grinders, precision thread 20,600
tools 74,502
Wyckoff Drawn Steel Co., Ambridge, Pa.; steel bar 46,205
steel 12,942
Wylam Metal Products, Inc., Philadelphia; trays, stacking 2,520
York Ice Machinery Corp., York, Pa.; install air conditioner 1,928
York Safe & Lock Co., York, Pa.; gun mounts 872,800
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.; steel 1,826
sheet steel 5,724
Zimmerman Steel Co., Bettendorf, Iowa; castings, steel 2,431
Henry Zuhr, Inc., New York; machine, fatigue testing 2,135

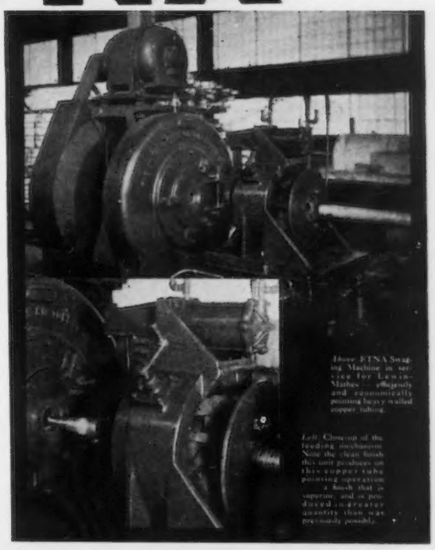
War Dept., Air Corps:

Aerial Machine & Tool Corp., New York; mount assemblies $124,920
Ainsworth Manufacturing Corp., Detroit; shackle assemblies 179,982

LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.



The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

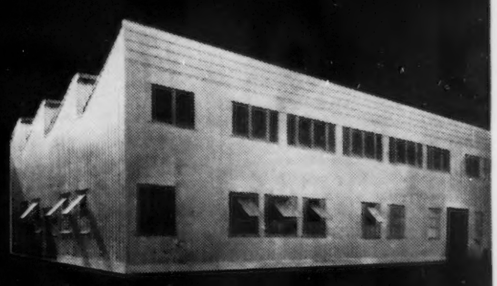
Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

CONTINENTAL *Modern* STEEL ROOFING AND SIDING!

Modern steel building sheets are the practical material for industrial plants, warehouses, garages, etc. Choose from Continental's 14 styles—all are galvanized by the SUPERIOR PROCESS.
CONTINENTAL STEEL CORPORATION
KOKOMO, INDIANA



CONTINENTAL SUPERIOR STEEL

CONTINENTAL STEEL CORPORATION

SHEETS: Galvanized, Black, Terne, Copperior, etc. WIRE: Bright, Annealed, KONIK, Specials, etc. Chain Link Fence, Nails, Roofing, etc.

ANOTHER FIRST: The first of 300 155 mm. gun carriages (top) to be manufactured by the Pettibone Mullikin Corp., Chicago, was delivered recently. Below, left to right at official acceptance of the first carriage are (left to right) Emmet Fallon, president of the company; Lt. Col. Elmer C. Goebert, Ordnance Department; Col. Donald Armstrong, Ordnance Department; E. J. Seifert, vice president and treasurer, Pettibone Mullikin Corp.; and Lt. Col. Barrett Rogers, Ordnance Department.

Air Associates, Bendix, N. J.; bolts 251,797
Air Conditioning & Refrigeration Supplies, Inc., Charleston, W. Va.; stand assemblies 57,940
Air Cruisers, Inc., Clifton, N. J.; cylinder and valve assemblies.. 143,652
Aluminum Co. of America, Washington; various items of aluminum 91,955
American Chain & Cable Co., Inc., American Cable Div., Wilkes-Barre, Pa.; cable, steel 232,394
American Gas Accumulator Co., Elizabeth, N. J.; trucks, field lighting 422,300
American Rolling Mill Co., Middletown, Ohio; iron and steel sheet 87,903
American Smelting and Refining Co., Whiting, Ind.; bronze, ingot 1,830
American Steel & Wire Co., Columbus, Ohio; cable 202,270
Ampco Metal, Inc., Milwaukee; bronze, aluminum rod 7,591
Aviation Manufacturing Corp., Lycoming Division, Williamsport, Pa.; aeronautical engines 17,993,883
Beech Aircraft Corp., Wichita, Kans.; maintenance parts 164,303
Bell Aircraft Corp., Buffalo; tanks 72,174
Bell & Howell Co., Chicago; film splicers and printer assemblies. 258,862
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind.; control assemblies 50,750
pumps 27,900
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J.; supercharger regulator assem. .. 928,329
Binks Manufacturing Co., Chicago; engine cleaners 20,150
Boeing Aircraft Co., Seattle; maintenance parts 2,872,679
J. I. Case Co., Racine, Wis.; tractor-mowers 144,666
Chandler-Evans Corp., South Meriden, Conn.; pumps, fuel 921,500
Chandler-Hill Corp., Detroit; pumps, fuel 535,750
Chase Brass & Copper Co., Inc., Waterbury, Conn.; brass rods and bars 66,219
Chicago Pneumatic Tool Co., Detroit; riveters, pneudraulic 94,275
Clark Tructractor, Division of Clark Equipment Co., Battle Creek, Mich.; tractors and spare parts 1,568,116
Colson Corp., Elyria, Ohio; cradle assemblies 232,010
Consolidated Aircraft Corp., San Diego, Cal.; maintenance parts. 568,087
spare parts 4,003,940
Continental Motors Corp., Muskegon, Mich.; cylinders and ring pistons 106,827
Crescent Insulated Wire & Cable Co. Inc., Trenton, N. J.; cable.. 148,437
Crescent Tool Co., Jamestown, N. Y.; wrenches 61,586
Curtiss-Wright Corp., Airplane Division, Buffalo; maintenance parts 503,985
Curtiss-Wright Corp., Curtiss Propeller Division, Caldwell, N. J.; governor assemblies 563,148
propeller assemblies 631,672
Ditto, Inc., Cnicago; duplicating machine supplies 139,323
Douglas Aircraft Co., Inc., Santa Monica, Cal.; spare parts 1,524,863
Duquesne Smelting Corp., Pittsburgh; bronze, ingot 2,210
Dzus Fastener Co. Inc., Babylon, N. Y.; grommets and cowling fasteners 61,071
Elastic Stop Nut Corp., Union, N. J.; nuts, assembly 147,608
Federal Motor Truck Co., Detroit; trucks 824,670
E. W. Ferry Screw Products, Inc., Cleveland; bolts 85,261
General Bronze Corp., Long Island City, N. Y.; cradle assemblies.. 54,600
General Engineering Co., Buffalo; washers 10,080
General Motors Corp., Allison Division, Indianapolis; tools and kits 272,293
aeronautical engines 195,300
parts for repair kits 189,780
engines 195,300
parts for engines 349,637
General Motors Corp., Harrison Radiator Division, Lockport, N. Y.; regulator assemblies ... 45,990
Gilbert Brass Foundry Co., St. Louis; bronze castings 7,961
Harrisburg Steel Corp., Harrisburg, Pa.; cylinders, gas 946,500
Jack and Heintz, Inc., Cleveland; airplane starter assemblies 1,925,000
Hinsdale Manufacturing Co., Chicago; socket wrenches 51,874
Independent Engineering Co., Inc., O'Fallon, Ill.; plant, oxygen generating 57,000
Kay Products Co., Detroit; cradle assemblies 59,750
dryer assemblies 59,079
Kelsey-Hayes Wheel Co., Detroit; oxygen cylinders 531,318
Kennedy Mfg. Co., Van Wert, Ohio; kits, tool 85,744
Link Aviation Devices, Inc., Binghamton, N. Y.; maintenance parts 52,122
Lockheed Aircraft Corp., Burbank, Cal.; spare parts 817,500
Lord Manufacturing Co., Erie, Pa.; maintenance parts 695,599
Manning, Maxwell & Moore, Inc., Jersey City; reamers 22,674
Glenn L. Martin Co., Baltimore; spare parts 3,666,020
turret assemblies 540,887
National Twist Drill & Tool Co., Detroit; reamers 3,850
Nichols Electric Co., Dayton, Ohio; cable 287,316
North American Aviation, Inc., Inglewood, Calif.; maintenance parts 1,360,505
Pheoll Mfg. Co., Chicago; screws. 62,972
Pump Engineering Service Corp., Cleveland; pump assemblies..... 466,941
Republic Aviation Corp., Farmingdale, N. Y.; maintenance parts. 781,946
Republic Drill & Tool Co., Chicago; drills 147,568
Reynolds Metals Co., Louisville, Ky.; various items of aluminum 253,637
John A. Roebling's Sons Co., Trenton, N. J.; cable steel..... 288,713
Rolls-Royce, Inc., Detroit; ball and roller bearings 772,287

Ryan Aeronautical Co., San Diego, Cal.; maintenance parts 146,834
Seifreat-Elstad Machinery Co., Dayton, Ohio; hammer machines 59,550
Seymour Mfg. Co., Seymour, Conn.; bronze rods, strip 5,612
Singer Sewing Machine Co., New York; sewing machines 144,962
Snap-On Tools Corp., Kenosha, Wis.; socket wrenches 366,573
Sperry Gyroscope Co. Inc., Brooklyn; spare parts for automatic pilots 711,965
maintenance parts 526,231
Spriesch Tool and Mfg. Co. Inc., Buffalo; shackle assemblies 372,100
Standard Steel Works, North Kansas City; trailers, semi, tank and dollies 965,448
box assemblies 96,846
Stewart-Warner Corp., Chicago; heaters, ground, portable 428,000
Superior Specialty Co., Canton, Ohio; washer assemblies 20,330
Thompson Products, Inc., Cleveland; pumps 970,655
Trailer Co. of America, Cincinnati; trailers, semi 80,340
United Aircraft Corp., Pratt & Whitney Aircraft Div., East Hartford; maintenance parts .. 1,445,769
engines 200,000
United Aircraft Products, Inc., Dayton, Ohio; regulator assemblies 81,814
United States Electrical Tool Co., Cincinnati; drills, electric, portable 58,970
Vultee Aircraft, Inc., Vultee Field, Cal.; maintenance parts 1,374,115
Watervliet Tool Co. Inc., Albany, N. Y.; reamers 10,379
J. H. Williams & Co., Buffalo; socket wrenches 422,794
Wright Aeronautical Corp., Paterson, N. J.; parts for engines ... 4,338,093
engines 34,034
tools 838,647
Yale & Towne Mfg. Co., Stamford, Conn.; pumps and motors 185,294

War Dept., Other Agencies:

C. Ahlborg & Sons, Inc., Boston; water and sewage system 15,400
American Chain Fence Co., Medford, Mass.; fencing of critical areas 9,680
American Medical Specialties Co., Inc., New York; sterilizers 8,840
American Steel & Wire Co. of N. J., Cyclone Fence Division, Cleveland; fencing 8,859
American Sterilizer Company, Erie, Pa.; sterilizer, drums 7,187
Anchor Post Fence Co. of Texas, Houston; chain link fence and gate 88,357
B. S. Andrus, St. Paul; water supply line and distribution system 25,783
Josiah Anstice & Co., Inc., Rochester, N. Y.; dishwashers 11,446
Atlas Heating & Ventilating Co., Ltd., San Francisco; stove pipe & fittings 2,095
James I. Barnes Const. Co., Santa Monica, Cal.; igloo type underground magazines 49,900
Barnes Wire Fence Co., Detroit; chain link wire-fencing 4,559
Becton, Dickinson & Co., Rutherford, N. J.; syringes 2,083
Bethlehem Steel Co., Bethlehem, Pa.; structural metal work for hangars 380,185
tinplate 10,351
reinforcing steel 10,095
Algernon Blair, Montgomery, Ala.; construction of armament and instrument inspection and adjustment building 91,468
G. S. Blakeslee & Co., Chicago; dishwashers 3,590
Blue Island Specialty Co. Inc., Blue Island, Ill.; points carborundum black 4,312
Emil Brown & Co., Los Angeles; potato peelers 2,234
Brown & Schrepferman, Inc., Denver; construction of one armament and instrument inspection and adjustment building 99,847
Buford Bracy, Little Rock, Ark.; motor repair shops 314,000
California Wire Cloth Corp., Oakland, Cal.; fencing 4,393
Carilli Construction Co., Dorchester, Mass.; construction of motor repair shops, etc. 85,792
Ernest F. Carlson, Inc., Springfield, Mass.; construction of armament and instrument inspection and adjustment bldg. 99,773
Caterpillar Tractor Co., Peoria, Ill.; tractor with bulldozer 5,974
Century Machine Co., Oakley, Cincinnati; puree mixer 7,943
Champion Dishwasher Machine Co., Erie, Pa.; dishwashers 2,535
Chayes Dental Instrument Corp., New York; engine wheels and handpieces 67,760
Cleveland Dental Mfg. Co., Cleveland; forceps and lancets 4,328
R. D. Cole Manufacturing Co., Newman, Ga.; steel water storage tank 18,165
Lowell J. Collins Agency, Piedmont, Cal.; dough mixing machine 2,126
Colson Corp., Elyria, Ohio; food carts, electric 12,845
Columbiana Boiler Co., Columbiana, Ohio; steel containers 251,629
Continental Can Co., New York; canisters 16,500
Crane Co., Sacramento, Cal.; pipe and fittings 4,585
Cyclone Fence Co., Waukegan, Ill.; fencing 12,643
Doehler Metal Furniture Co. Inc., Plainfield, Conn.; cabinet, instrument, field 14,892
Dohrmann Hotel Supply Co., Los Angeles; coffee urn batteries .. 6,460
kitchen equipment 19,530
Erie City Iron Works, Erie, Pa.; water heating boiler unit 25,947
Ervin & Co., Philadelphia; test tube supports and sterilizers ... 5,647
Fairbanks, Morse & Co., Boston; pumping station equipment..... 87,532
Fearless Dishwasher Co., Inc., Rochester, N. Y.; dishwashers .. 1,980
Feenaughty Machinery Co. Inc., Seattle; parts for paver 2,650
Fisher Scientific Co., Pittsburgh; vacuum pumps 2,508
Fruehauf Trailer Co., Warren, Pa.; semi-trailers gasoline tank 16,368
General Air Conditioning and Heating Co., San Francisco; water coolers, electric 4,742
Frigidaire Division, General Motors Sales Corp., Oakland, Cal.; refrigerators 4,696
General Refineries, Inc., Minneapolis; wire 51,156
Girard Dental Mfg. Co., Philadelphia; chisels; excavators; scalers; and pluggers 9,271
James Graham Mfg. Co., San Francisco; ranges 13,288
Grieshaber Mfg. Co., Chicago; knives 15,805
George Hoffman and Sons, Inc., New York; boiler house, steam distribution system, etc. 100,703
Hospital Supply Co. and Watters Laboratories, Consolidated, New York; steam disinfector 2,495
Hussman-Ligonier Co., St. Louis; refrigerators 6,556
Adolph G. Johnson, Galveston, Texas; motor repair shops 82,000
Hugo R. Kirsten, Brooklyn; splint, wire ladder 4,575
William Langbein & Bros., Brooklyn; forceps 13,400
knives 12,555
Layne-Texas Co., Houston; installing deep well turbine pump and electric motor, constructing pump house and installing pipe line... 56,939
Lippert Co., Boone, Iowa; sewage pumping station and force main 42,887
Market Forge Co., Seattle; cold storage beef track equipment... 7,640
Mercury Mfg. Co., Chicago; trucks and tractors 48,860
Montag Stove & Furnace Works, Portland, Ore.; pipes and fittings 14,175
Montague Co., San Francisco; deep fat fryers, ranges and bake ovens 21,894
Northwest Steel Rolling Mills, Inc., Seattle; tie bars and dowels ... 5,523
Ohlen-Bishop Co., Lawrenceburg, Ind.; saws, butcher 3,952
Olson Construction Co. Dobson and Robinson, Ogden, Utah; construction and installation of boiler and air compressor and receiver 14,753
Oneida, Ltd., Oneida, N. Y.; forceps 108,500
knives 8,235
J. C. Pitman & Sons, Inc., Lynn, Mass.; deep fat fryers 2,363
Plowden & Roberts Co., Columbia, S. C.; chain link fences 10,386
Prometheus Electric Corp., New York; sterilizers 18,825
Ray Oil Burner Co., San Francisco; oil burners 3,731
Ritter Dental Mfg. Co., Inc., Rochester, N. Y.; engines, elec.; hose and tubing 9,336
Rose Construction Co., Abilene, Texas; construction of motor repair shops, etc. 61,000
Savory, Inc., Newark; gas toasters 2,297
A. D. Schader, San Francisco; construction of railroad spur ... 24,879
Security Fence Co., Somerville, Mass.; standard chain link fence 62,629
Sichel Bakery Equipment Co., San Francisco; revolving tray oven and baker's tables 2,602
Simplex Wire & Cable Co. of Cal., San Francisco; armored cable .. 2,626
J. Sklar Mfg. Co., Long Island City, N. Y.; forceps 171,637
metcalf sets 498,565
W. C. Smith, Inc., Duluth; barbed wire fence 5,280
E. . Squibb & Sons, Brooklyn; protein silver 13,050
Standard Gas Equipment Corp., Los Angeles; deep fat fryers 3,505
George Stewart, Newark; steam distribution and pump return system 124,900
Taylor Iron Works and Supply Co., Macon, Ga.; steel frame of control tower 5,295
Thomson Diggs Co., Sacramento, Cal.; fencing 2,140
United-Carr Fastener Corp., Cambridge, Mass.; hardware and tools 18,182
Washington Corrugated Culver Co., Seattle; installation tools and culvert pipe 35,271
Washington Cycle & Supply Co., Seattle; trucks, cargo, hand, two-wheel 4,351
Watson Automotive Equipment Co., York, Pa.; semi-trailers refrigerator 26,550
Charles R. Watts & Co., Seattle; concrete curing membrane and power sprayers 6,950
Edward Weck & Co. Inc., Brooklyn; forceps 97,920
Westinghouse Electric Supply Co., San Francisco; cable 2,398
Western Pipe & Steel Co. of Calif., San Francisco; pressure tanks.. 14,396
storage tanks 5,361
Zimmer Splint Co., New York; litter rings 3,150

Small Plants in Illinois Threatened

Chicago

• • • **Two-thirds of small** businesses in Illinois will cease operations before the close of the year if they do not obtain defense orders, a survey conducted by the Illinois Small Business Men's Association shows.

Out of 2000 firms to be queried, the first 100 returns showed 64 plants face shutdowns unless they obtain war business. The next 150 returns followed the same proportions. Of the first 100 studied, only 22 had received armament business, some of which was so small that it amounted to only one per cent of a plant's capacity. Almost all plants reported that they had solicited slices of the defense pie but woefully added that they saw no reason to expect greater success in the future than had so far been accorded them. Only 12 plants admitted that they could not handle preparedness work; 13 said they were three-fourths adaptable; 22 half adaptable; 19 a quarter adaptable, and eight said they could use about a one-tenth of their facilities.

The association says the time has come for the elimination of "red tape" and administration of defense by bureaucrats if small business in the country is to be saved. Forcing the small plant out of operation now will certainly make it difficult, and perhaps, impossible for them to start up again after the current defense push is over.

Cemented Carbide Tools Under July 17 Priority Order

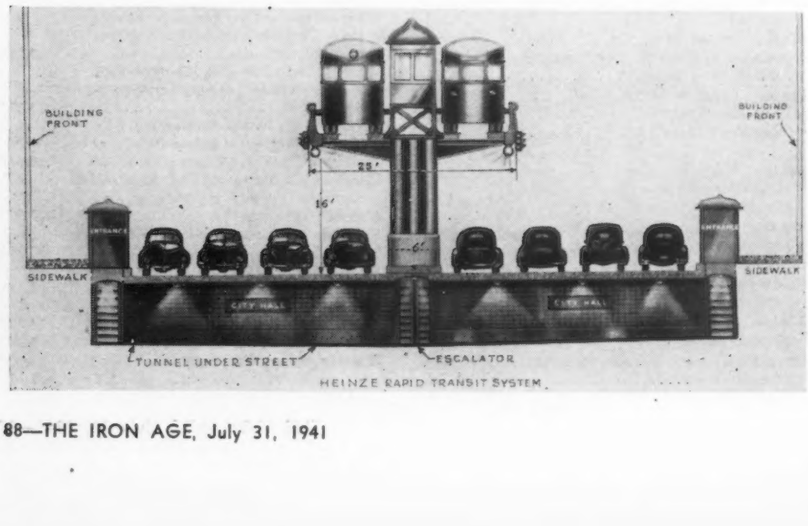
Washington

• • • **Cemented carbide tools** have been brought within the provisions of the July 17 general preference order which directed the use and distribution of cutting tools and assigned a preference rating of A-10 unless higher preferences have been specifically awarded.

In a revision of the July 17 order, Director of Priorities E. R. Stettinius, Jr., explained that the original order permitted deliveries of non-defense orders if defense orders on hand had been completed. Under the revision, no manufacturer or distributer may accept an order for or make delivery of cutting tools unless this delivery bears a preference rating of A-10 or higher, except upon the specific direction of the OPM.

The new order also included a reworded Section (h), clarifying the status of manufacturing processes carried on during the six weeks' period dating from July 17.

NOISELESS EL: Rubber tired, rapid transit cars, operating on a streamlined elevated right-of-way, made admost entirely of pressed steel parts are being advocated in Detroit. The design proposed (below) will do away with the ugly appearance of conventional elevateds and will eliminate the clatter and noise associated with this means of transportation. The 25-ft. roadbed, 16 ft. above the city streets will be supported on six-foot columns, made of pressed steel, box shaped members spot welded together. The cantilever beams supporting the elevated would also be made of pressed steel, spot welded. The weight of this type of elevated is estimated at 1300 tons per mile, compared with 6000 tons per mile in conventional elevated construction, The material proposed for this fabrication consists of 5/32 and ⅛ in. high tensile sheet steel.



OPM E-2 Cutting Tool Order Hits Auto Plants

• • • **First reading of** OPM's general preference order No. E-2 putting cutting tools on a priority basis as of July 17 (THE IRON AGE, July 24, p. 92) did not seem to put any immediate hardship on any one industry.

When it is considered, however, that certain cutters are restricted to holders of priority ratings of A-10 or higher one realizes that practically all non-defense industries cannot obtain the vital small tools and cutters needed to carry on their operations. For one thing, this means that passenger car manufacturers as the order now stands cannot get special drills and reamers of all types, countersinks, counterbores, special milling cutters of all sizes and types, high speed steel taps, high speed steel chasers, machine broaches and tungsten carbide tools of all types. Truck makers have an A-3 rating and will be taken care of. But passenger cars will have to wait until all defense needs are taken care of.

New Blanket Rating Applies to Materials

Washington

• • • **A new plan for granting** OPM limited blanket ratings to important defense projects provides that orders covering projects selected for such treatment can be used to expedite deliveries of materials so long as the materials are on the Priorities critical list. The order carrying this preference rating will be, in general, similar to blanket ratings hitherto assigned to builders of freight cars, merchant shipbuilders, and producers of machine tools and cranes.

The builder who gets the rating may apply it to his deliveries by executing a copy of the order and serving it on his suppliers. Additional orders flowing into the project may be given the rating by citation of the original order and the serial number assigned to the builder. Provisions are included so that the rating may also be extended by sub-suppliers. The form to be used in granting the new project ratings is P-19-a.

Local Scrap Drive Nets Armco 400 Tons

Middletown, Ohio

• • • **Taking its employees** and the community into its confidence on the scrap stringency, American Rolling Mill Co., in the first four days of a drive for old materials uncovered 400 tons not previously known. Back in June Calvin Verity, executive vice-president and general manager of the steel company, organized a Defense Committee with employee members from the various divisions in Middletown.

Last Tuesday, Mr. Verity sent a letter to members of the committee calling attention to the scrap shortage pointing out that unless there was an increase in supply within two weeks a partial shutdown was inevitable. He asked the committee members to look about for scrap which was not coming into the market through the usual channels. A full page ad was inserted in Middletown papers along with news stories telling the community that scrap was badly needed and the yards of the nation were without sufficient material to meet the urgency.

Employees and members of the community were requested to report any iron or steel scrap available through a special telephone number installed for the purpose. Within the first 48 hr., 28 telephone calls were received turning up 260 tons. Cooperating through the usual channels, Armco will give this information to scrap dealers of Middletown who in turn will proceed to collect the material, prepare it and make this available for use at the Middletown plant.

Officials reported that the first 28 calls brought a threshing machine, a tractor, a washing machine, a lathe, girders, radiators, fences, furnaces, fire place grates, an auto body and steel rails.

THIS WEEK'S Priorities and Prices

(OPACS)—Highest civilian rating has been granted manufacturers of thermostatic bi-metal or **temperature control devices to** assure continued production of this equipment.

(OPACS)—Farm machinery and equipment makers have also been given highest civilian preference ratings. Quantity of materials received under such rating cannot exceed 20 per cent more than amount used in corresponding period of 1939 or 1940, whichever was higher.

(OPM)—Preference rating of A-10 assigned to **27 producers of aircraft and** equipment to facilitate production of civil aircraft for pilot training schools. Repair parts also included.

(OPM)—Copper alloys in which amount of copper equals or exceeds amount of all other metals is now exempt from regulations of General Metals Order No. 1. Control of this material is provided through recently issued order covering copper and its alloys.

(OPM)—Training courses for business, industrial and trade association executives are planned to acquaint industry with priorities procedure.

(OPM)—Increase of 6,508,950 tons in **pig iron capacity** approved; government financing recommended.

(OPM)—Expansion in Canadian **nickel output** planned to enable U. S. to incerase imports by 20 per cent. Possibility weighed of increasing U. S. imports of zinc, lead, and chlorine from Canada.

(OPM)—Several revisions made in priorities order concerning use and distribution of **cutting tools.** Cemented carbide tools now included in order and no manufacturer may deliver cutting tools to any customer without a rating of A-10 or higher, except with specific permission of OPM.

(OPM)—Important **defense projects** will be granted blanket preference ratings, covering all materials going into the job, instead of past practice of issuing individual certificates for each item required.

(OPM)—Reprieve granted **automobile manufacturers** from 50 per cent cut in output ordered by OPACS.

(OPM)—Calcium-silicon, used in treatment of certain high grade steels, was put under full priority control on July 28.

(OPACS)—Tin can manufacturers have been given preference treatment on **tin plate** required to pack the current food crop. No shortage of tin plate exists yet, the price agency said, but preference treatment is necessary to assure an orderly flow to can makers.

(OPACS)—Warns of possibility of a ceiling on **tin prices** due to unstable conditions in the Far East, causing prices here to rise.

Wheeling Opens Mail Campaign

Portsmouth, Ohio

• • • **In an effort** to increase its supply of scrap steel, Wheeling Steel Corp. last week enlisted the aid of the United Service Organization in a community scrap collection program. Wheeling mailed out 4000 return post cards asking the recipient to give whatever scrap was in his house to the USO. Wheeling then paid the USO for the material collected, thus increasing the USO income and Wheeling's scrap pile. At the time of going to press no report of the amount of scrap collected was available.

Auto Wrecking Problems Debated

Columbus, Ohio

• • • **Seeking to stimulate the** movement of scrap from auto wreckers, OPM and OPACS held a rally here July 25 which was attended by about 300 persons. The wreckers, who will work out their individual problems separately, pledged full cooperation after speakers had explained the critical scrap situation.

The wreckers indicated a preference toward starting to scrap 1932 models and older, asserting cars since 1932 must be held for their parts value. Against this argument it was countered that parts could be removed and held while the balance of the cars could be scrapped.

Another angle brought up by the wreckers, who came from all over the state to the meeting, was the high cost problem, both as to original purchase price and labor cost. Every effort to provide relief was pledged by authorities.

(Other Scrap News on Page 108)

Auto Union Lists Ford Competitors

Detroit

• • • **Wage negotiations between** the Ford Motor Co. and the UAW-CIO started July 22 in accordance with terms of the contract signed June 20. On the afternoon of the day negotiations were started about 9200 employees were involved in a work stoppage which resulted because tool and die plant workers were fearful that their wage scale would not be included in the wage negotiations. About 2000 men quit work in the tool and die plant followed by 7000 in the motor building and 200 in the rolling mill. This latter dispute was reportedly over rest periods. The men returned to work after Michael F. Widman, Jr., director of the Ford Organizing Committee, talked to them at the plant.

In accordance with the plan announced at the time the contract was signed, the union has submitted a list of major competitors of Ford in the automobile, glass, steel, cement and tire industries. This list was to serve as the basis of wage negotiations since Ford had agreed to pay wages as high as any competitors in any department. According to union officials the list was approved with one exception. The companies named included General Motors Corp., as the automotive competitor; the Detroit Edison Co., power house units; Goodrich Tire & Rubber Co., for the rubber plant; Libbey-Owens-Ford Glass plant at Ottawa, Ill., for the glass plant; Republic Steel Corp., Cleveland district, for the rolling mill, open hearth, electric furnace, blast furnace and coke ovens, except for the electric steel furnaces in which case the union designated the central alloy district of Republic Steel Corp.; the Michigan Alkali Co. for the cement plant.

The union did not designate a "standard" company in the transportation department, fabricating shops, production welders in the foundry, nickel plate unit in the foundry, the magnesium foundry, the jobbing foundry or the paper mill.

The dispute which resulted in the partial shut-down last week was at least the third or fourth which has reached public notice. Early in the month approximately 400 men quit work on the final assembly line in the B building in a dispute about overtime pay for work on Saturday. The shutdown was attributed by the union to the action of a foreman, although there was some indication that the shutdown was actually caused by a sitdown. However, it only lasted 15 minutes.

Another minor strike was at the Highland Park plant where 2500 employees refused to work because they wanted a separate local set up for them by the CIO and sought to withdraw from the huge Ford local, No. 600, which covers the Rouge plant.

J. & L. Leases New York State Ore Property

Pittsburgh

• • • **To increase its pig iron** and steel output "largely in the interest of the National Defense emergency," Jones & Laughlin Steel Corp. has leased a large tract of land containing deposits of iron ore in St. Lawrence County, N. Y. The property is to be developed as an iron ore mine to supplement present J. & L. ore operations and properties in Minnesota and Michigan.

The tract of 3200 acres, situated 65 miles east of Watertown, N. Y., on the western slope of the Adirondack Mountains, is being leased from the Benson Iron Co., Inc. Its location is such that it can be operated during the entire year.

"The concentrates from the Benson ores will have a higher iron content than Lake Superior ores, making possible a material increase in iron production for the same volume of materials handled in the blast furnaces," H. E. Lewis, J. & L. president, said. "Also the Benson concentrates will be very low in phosphorus, which, for reasons of quality, makes them particularly desirable for use in the Bessemer process, comprising about 20 per cent of our steelmaking capacity."

Construction of equipment to mine and treat the ore, together with rail shipping facilities, at a cost of $2,750,000, will require 18 months for completion, after work is started. It is expected that J. & L. will mine sufficient tonnage of crude iron ore to produce 800,000 tons of concentrated and "sintered" ore per year, which will augment its present production of 4,000,000 tons of iron ore now being mined in the Lake Superior region each year.

WELDED CRUTCHES: Arthur Madson, chief instructor since 1929 at the Lincoln Electric Co.'s school of arc welding, Cleveland, fully believes in the subject he teaches. When Madson broke his leg recently on a fishing trip, he designed his own crutches of 1-2 in. seamless steel aircraft tubing, had the tubing formed to his design and then, personally, welded the crutches with "Planeweld" electrodes developed by the company for welding airplanes.

SWOC Strikes at Canadian Government Run Steel Plant

Toronto

• • • **Following unanimous** vote of the Steel Workers Organizing Committee to declare a strike at the Hamilton works of National Steel Car Corp., workers refused to go to work for the Tuesday shift and operations at the plant have been suspended. The SWOC demanded that a representative empowered to negotiate and sign a collective bargaining agreement on behalf of the company be appointed to meet a committee of the union and a message was sent to Minister of Labor McLarty to this effect. No action was taken by the company or government and the men did not appear for work at Monday's 11 o'clock shift. E. J. Brunning, who was appointed government controller at the plant last April, has made no announcement.

New Testing Laboratory Planned for War Equipment

Washington

• • • **The properties of metals,** and alloys, their fabrication and welding, will be studied in the Bureau of Standards new $500,000 materials testing laboratory to be constructed shortly. The building also will house increased facilities for the calibration of precision gages used in mass production of munitions, for the studies of fuels, lubricants and ignition problems, for the testing of aeronautic instruments, auxiliary aircraft equipment and other military supplies.

Bradley & Son, Started In 1832, Is Reorganized

• • • **Reorganization of C. C. Bradley** & Son, Inc., Syracuse, N. Y., after nine years of operation under receivership, is announced by Goodwin Bradley, vice-president and secretary of the company. The president and treasurer of the company, which was incorporated in 1832, is Dana W. Norris, formerly vice-president of the Lennox Furnace Co. Mr. Bradley has been associated with the company, which manufactures power hammers and does iron and steel work, for 14 years.

Industrial Advertisers Will Meet Sept. 17-19 at Toronto

• • • **Questions submitted by** industrial advertising managers to the National Industrial Advertisers' Association will be answered by government officials and business and advertising executives at the conference of the association Sept. 17-19 in Toronto, Canada. Most of the questions will deal with the effect of the defense program and the war on industrial advertising.

Armstrong Cork Gets Order For Million Shell Casings

• • • **J. J. Fitzpatrick, head** of the Munitions Division of the Armstrong Cork Co., announces the receipt of a contract from the War Department for the manufacture of one million 37 mm. brass shell casings.

Lay-offs Blamed On Shortage of Steel

Milwaukee

• • • **Because shortage of steel has resulted in sharp lay-offs at the Nash Seaman Body Division, CIO leaders here have protested by telegram to federal authorities against the proposed blanket 50 per cent curtailment of automobile production. Union leaders claim that in the last several months the Seaman plant payroll has dropped from a peak of about 3400 workers to less than 1000. (Lack of steel is estimated to have cost the Nash plant one week's output.)**

Midvale Co. Owners to Vote on Stock Split-Up

• • • **Stockholders of the Midvale Co.,** one of the country's largest manufacturers of armor plate, will vote Sept. 10 on a three-for-one split-up of authorized capital stock shares. There will be no change in stated capital or surplus, which at the end of 1940 were $10,574,621 and $3,728,668 respectively. Baldwin Locomotive Works is the largest stockholder, with 61.45 per cent of the shares.

Falls Spring & Wire Buys Buckle Company

• • • **The Compress Buckle Co.,** of Attalla, which holds a $1,000,000 shell order from the War Department, has been purchased for an undisclosed amount by the Falls Spring & Wire Co., Detroit. F. B. Todd, owner of the Compress Buckle Co., has been named vice-president of the Falls Spring & Wire Co.

New Yard Completed For Electric Boat Co.

• • • **Electric Boat Co., Groton, Conn., has completed a new shipyard at a cost of $3,000,000, and has spent nearly $2,000,000 in improving its original yard. It took ten months to construct the new yard, which is in full production. The company employs 5500 workers and is turning out submarines ahead of schedule, 21 having been launched since 1933.**

International Nickel to Spend $25 Million to Boost Output

Washington

• • • **Completion of arrangements** to expand nickel production in Canada so that United States imports of the metal can be increased 20 per cent was announced Friday by OPM following a meeting of the Material Coordinating Committee of the two countries. The expansion will be undertaken by International Nickel Co. Possibility of the United States obtaining increased amounts of lead, zinc and chlorine from Canada was also discussed.

↓ ↓

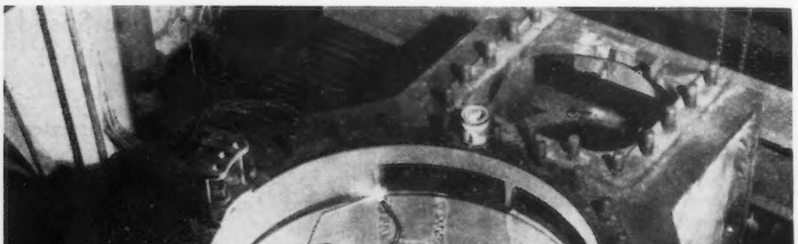
Toronto

• • • **International Nickel Co.** will spend $25,000,000 over the next three years for expansion of nickel output, C. D. Howe, Minister of Munitions and Supply, has reported. While official details of the expansion are not available, it is believed that within a year the company will be treating 1,000,000 tons of ore a month, as compared with about 750,000 tons monthly at present. Falconbridge Nickel Co. has outlined an expansion program involving $1,000,000 at its Sudbury plant. United States imports of nickel from Canada have been at a rate of 15,000,000 lb. a month recently.

Meanwhile, a wide scale program to reduce nickel use in non-defense industries is underway here. An order, effective June 15, limits non-defense nickel use in nickel-plating to 60 per cent of 1940 consumption.

2 Destroyers Launched By Federal Shipbuilding

• • • **A new record for the** rapid construction of modern destroyers was established by Federal Shipbuilding & Dry Dock Co., a United States Steel Corp. subsidiary, when two destroyers were launched last week in a twin ceremony at Kearny, N. J. The vessels, the U.S.S. Bristol and the U.S.S. Ellyson, slid down the ways seven and one-half months after keel layings. The previous construction record was made by Federal on the U.S.S. Edison.



REPAIRING AXIS SHIPS: Repair on German and Italian cargo vessels damaged by their crews in U. S. ports is rapidly bringing the ships to the place where they may be used. This photograph shows how bronze-welding has made possible the repair of engines without removing the engines from the ships.

Murray-UAW Contract Bans Strikes Without Vote

Detroit

• • • **A labor contract which** goes even a step beyond the Ford-UAW (CIO) contract was signed in Detroit last week by the Murray Corp. of America with the United Automobile Workers (CIO). The pact provides for establishment of the union shop and check-off system and also puts a ban on strikes and walk-outs unless voted by a majority of employees in a secret ballot conducted and counted by company and union officials.

It is the first time since the signing of the Ford contract on June 20 that a major automobile manufacturing company has followed Ford in regard to the union shop and check-off. It is the first time in the history of the UAW-CIO that a strike limitation has been provided.

Murray Corp. of America is a stamping concern manufacturing automobile bodies and frames and other pressed metal products. Recently it has undertaken large aircraft sheet metal contracts.

OPM Defense Contract Coordinators Named

Washington

• • • **John J. Lenahan,** president of Excelsior Steel Ball Co., Buffalo, has been named coordinator of the OPM defense contract service for the Buffalo area; and Charles W. Allen, vice-president and general manager of the Belknap Hardware & Mfg. Co., Louisville, Ky., has been designated coordinator for the Louisville area.

The defense contract service, maintained to help the Army and Navy spread defense work into more plants, at the same time appointed coordinators for Little Rock, Ark., and Seattle, Wash.

At Pittsburgh A. E. Walker, coordinator, announced the appointment of Charles E. Robinson as deputy district manager, Defense Contract Service, whose office will be in the Federal Reserve Bank of Cleveland, Pittsburgh branch, 717 Grant Street, was secretary-manager of the Pittsburgh Commission for Industrial Expansion.

Low Grade Aluminum Stocks Held Vital

Cleveland

• • • **Rising stock piles** of low grade aluminum, which have attracted much interest recently and resulted in occasional complaints from non-defense users unable to get the material, will be vital later on for the defense program, says Walter M. Weil, president of National Smelting Co. here.

Practically all low grade aluminum can be fitted into the defense program ultimately, he explained. Some Army and Navy specifications have been relaxed already to permit its usage, and other specifications will be changed sooner or later.

"To me the program is pure common sense," Mr. Weil told THE IRON AGE here late last week. "If low grade aluminum escapes into non-necessity production now, it won't be available later when large stock piles will be needed. Substituting secondary aluminum whereever feasible simply releases an equal tonnage of virgin aluminum for airplane wings.

"Fabricators evidently will have to get in step with the times. Personally, I feel the emergency situation has been forced on us by outside world events, and it is necessary for us to act speedily, making full sacrifices."

While airplane wings require new metal, low grade aluminum can be used widely for aircraft castings. Remelters are supplying more and more low grade material daily for aircraft work.

The solution for non-defense industries requiring aluminum is to get into the defense program as speedily as possible. In the first place their production capacity is needed, according to Washington authorities and in the second place there is a good chance metal may be obtained in the interim during the changeover, which will enable working forces to be kept intact. Much redesigning for the aircraft program is going forward at Wright Field in Ohio.

Contrary to an impression widely held by the public, a lot of the aluminum now being collected over the nation from households is high grade material. Pots and pans of aluminum can go into many high grade aluminum castings.

Jessop Steel Builds New 84-in. Plate Mill

• • • **Jessop Steel Co.,** Washington, Pa., has begun construction of a new 84-inch, two-stand plate mill, Harry Wilson, Jr., works manager, reports. This is part of a large plant expansion and modernization program being undertaken by Jessop in the interests of national defense. The new plate mill will be housed in an extension of the company's sheet mill building, the extension consisting of four additional bays. The mill is electrically driven and will be supplemented by the installation of six modern heat treating furnaces capable of increasing plate production 50 per cent.

Also under construction at the Jessop plant is a new building for the storage of billets, ingots, scrap and other raw materials. It is being erected parallel to the present building for electric furnaces, and will be well equipped with crane facilities for quick loading and unloading of materials.

Full Priority Control On Calcium-Silicon

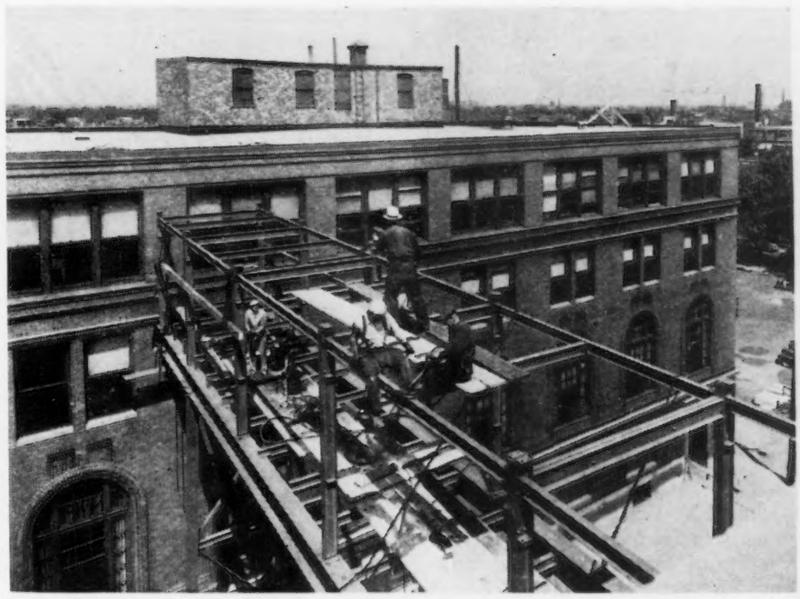
Washington

• • • **Calcium-Silicon,** used for the treatment of certain high-grade steels needed for defense production, was put under full priority control on Monday in a General Preference Order signed by E. R. Stettinius, Jr., OPM Director of Priorities. The other requires consumers of calcium-silicon to file reports with their suppliers when placing orders, and states that the Director of Priorities will issue instructions for the allocation of all available supplies to customers.

OPACS Names Industrial Machinery Price Executive

Washington

• • • **OPACS has named** Joel Dean, assistant professor at Chicago University's school of business administration, as price executive in charge of industrial machinery. An industrial engineer, Dr. Dean was formerly with the McKinsey-Wellington & Co., and the International Business Machine Corp. Recently he has specialized on price and marketing problems in a wide range of industries.



RYERSON BRIDGE: Among the latest additions at Joseph T. Ryerson's 21-acre steel-service plant at Chicago is this new bridge connecting two main office buildings. The 66-ft. glassed-in span will hasten flow of work between departments.

Bullard Co. Opens New Assembly Plant

• • • **Record-breaking speed** in expansion of Bullard Co. production facilities to meet growing needs of the national defense program was signalized Monday, July 28, at a housewarming marking official completion and operation of the company's new $4,000,000 assembly building on a 13-acre site across the street from the main plant at Bridgeport.

Following a luncheon a general inspection tour of the entire plant was made. This was followed by a New England clambake on the estate of E. P. Bullard, president. Present were representatives of the Army and Navy, the OPM directors and members of the defense committee of the National Machine Tool Builders Association, members of the State Educational Department, and others.

Unusual speed characterized the construction of the new assembly building by the Turner Construction Co., general contractor. Steel was delivered to the site on April 28. Bullard executives took possession of the plant on July 4 and operating and manufacturing equipment was installed during the 10-day period ending July 14. Within 24 hr. finished machine tools were being shipped out to defense industries.

The structure measures 540 x 180 ft. and rises to a one-story height of 60 ft. above the grade floor, under which is a basement half the length of the building. Its more than three acres of production space is enclosed by structural steel framing, with exterior walls of protected metal and glass. Three 60-ft. crane-ways have been installed on the main floor as part of a specially planned assembly line, which, it is reported, has been largely responsible for the effective speed-up of work.

Output of 2 Canadian Plate Mills Taken by Government

Toronto

• • • **Canada's steel** plants and rolling mills are operating at capacity but are continually falling farther behind in supplying Canadian steel needs. Mills now are almost solidly covered to the end of the year, with backlogs at an all-time peak. It is reported that the Government has taken over the entire production of the plate mill at the Hamilton works of the Steel Co. of Canada, Ltd., for consumption under its shipbuilding program, and no plates will be available for other consumers before next year, and even deliveries then are doubtful. Production of the plate mill of Canadian Foundries & Steel, Ltd., at Hamilton, Ont., also has been taken by the Government and it is stated that this company now is confining its rolling to armor plate.

• **J. Walter Snavely,** district manager in the Houston territory for seven years, has returned to the sales department of the conveying and engineering products division at Milwaukee of the Chain Belt Co. He was graduated from the University of Wisconsin and entered the employ of the company as a student apprentice in 1927. **W. A. Pitts,** formerly representative in Oklahoma City, has been appointed district manager of oil well sales at Houston. He has been identified with the company since 1936. **George Hunt** has been made district manager of industrial sales, with headquarters at Dallas, Tex.

• **Daniel M. Watts,** formerly management engineer acting in the capacity of assistant general manager for Bendix Aviation Corp., South Bend, Ind., has assumed new duties as factory manager for the Kaydon Engineering Corp., Muskegon, Mich., specializing in the manufacture of special bearings for defense purposes. Prior to his association with the Bendix organization Mr. Watts was associated with Packard Motor Co., Pontiac Motor Co. and with the Chrysler Corp.

• **Edward L. Biersmith, Jr.,** formerly assistant sales manager of the Columbian Steel Tank Co., Kansas City, has been promoted to production manager. He has been connected with the company for the past 12 years and was at one time identified with the Ford Motor Co.

J. WALTER SNAVELY, who has returned to the sales department of the conveying and engineering products division of the Chain Belt Co.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **R. H. Olson,** since 1929 New York district manager of sales of the Electric Machinery Mfg. Co., Minneapolis, has been appointed Eastern sales manager. He has been associated with the company for 25 years, having been previously in charge of the Minneapolis and St. Louis district sales.

• **Raymond C. Blaylock** has been appointed chief engineer at the new Port Columbus plant of Curtiss-Wright Corp., working as engineer on the famous Curtiss Hawk and Curtiss dive bomber to be manufactured there. **Bruce G. Eaton, Jr.,** has been named senior project engineer. **J. A. Williams** is general manager of the Columbus factory.

• **James Dykstra** has been named assistant chief engineer of Olds Motor Works, division of General Motors Corp. He is in charge of chassis and body design, succeeding **Maurice A. Thorne,** who has been transferred to Detroit to be associated with **C. L. McCuen,** vice-president of General Motors Corp., in charge of defense engineering. Dykstra has been connected with General Motors for 19 years. He was born in The Netherlands in 1893 and came to this country in 1902. From 1914 to 1917, after getting his engineering education in the Detroit Technical Institute, he was a draftsman with the King Motor Car Co. of Detroit. Later he joined the engineering staff of Hudson Motor Car Co. During the period of the first World War he served with Packard Motor Car Co. as airplane designer. In 1921 Mr. Dykstra transferred to the Oakland Motor Car Division, now Pontiac Division of General Motors. He went to Lansing as a designer for Olds in 1925 and in 1927 was made engineer in charge of chassis design.

• **Russel G. Davis,** after 20 years of service with the Chain Belt Co., Milwaukee, has been appointed manager of the commercial gear plant of Foote Brothers Gear & Machine Co., Chicago. Mr. Davis is a graduate of the University of Wisconsin in mechanical engineering and has been associated with the mechanical power transmission industry since 1921 when he joined Chain Belt as student apprentice, later being advanced to general foreman of the chain division; district manager at the Houston office and district manager of the Chicago territory and assistant to the sales manager of the chain division.

• **Frederick A. Stevenson,** heretofore vice-president in charge of operations of American Car & Foundry Co., New York, has been elected senior vice-president. He has spent his entire business

DANIEL M. WATTS, factory manager of the Kaydon Engineering Corp.

career in the service of the company.

• **Henry L. Clark** has been appointed general manager of the Southern California division of General Motors Corp., at South Gate, Cal., succeeding **Raymond J. Wilkins,** who will become a member of the labor relations staff in Detroit. Mr. Clark has been with General Motors since 1918.

• **John W. Converse** has been elected a member of the board of directors and executive committee of General Steel Castings Corp., Eddystone, Pa.

• **Benjamin T. Moffatt,** previously Eastern division manager of the Hewitt Rubber Corp., Buffalo, has been elected a vice-president, with headquarters at 70 Pine Street, New York.

• **Archie Morris** has been appointed Southern California representative for McKenna Metals Co., Latrobe, Pa. Offices remain at 4905 Santa Fe Avenue, Los Angeles.

• **A. T. Carter,** has been appointed representative in upper New York state by the Keystone Carbon Co., St. Marys, Pa. He will make his headquarters in Rochester, N. Y.

• **Robert M. MacIntosh,** since 1932 chief chemist of Guggenheim Brothers Research Laboratories, N. Y., has been appointed head of the division of analytical chemistry at Battelle Memorial Institute, Columbus, Ohio.

• **T. E. Conklin,** heretofore assistant traffic manager of Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., has been made traffic manager, succeeding the late H. S. Sturges. **W. H. McKean** has been appointed assistant traffic manager.

• **Edward Nelson Case** has joined the research staff of the A. F. Holden Co., New Haven, Conn. **James Ceriani,** heretofore research chemist with E. I. du Pont de Nemours & Co., has also joined the research staff of the Holden company.

• **J. M. Bowlby** has been elected president of the Eagle-Picher Lead Co., Cincinnati, succeeding **Joseph Hummel, Jr.,** who has been made chairman of the board.

Obituary

• **Merritt L. Fox,** engineer for General Motors Corp., was drowned, July 9, in Sandy Bottom Lake near Brighton, Mich. He was 61 years old. He was a graduate of Cornell University and was once instructor of mechanical and electrical engineering at the University of Iowa. For nine years he had been employed at General Motors Proving Grounds near New Hudson, Mich., where he lived. He was a member of the National Safety Council, the Engineering Society of Detroit, and of the American Society of Mechanical Engineers.

• **Francis L. Searway,** assistant general superintendent of the Charlestown, Mass., Navy Yard, died at his home in Newton, Mass., July 18. He was born in Fort Fairfield, Me., 56 years ago.

• **Robert M. Jones,** purchasing agent for General American Transportation Co., at Masury, Pa., died July 25 at his home at the age of 66. At one time he was purchasing agent of the Reeves Co., Alliance, Ohio.

• **Walter C. Potts,** general sales manager of the maintenance division of Rinshed-Mason Co., automotive paint manufacturers, for the past 18 years, died recently in Detroit. Born in Belle River, Ont., Mr. Potts had been in Detroit for 40 years.

• **August W. Sidell,** one of the earliest members of the field demonstrator staff of the Gisholt Machine Co., Madison, Wis., died on June 30, aged 76 years. He had been retired for a number of years.

• **H. S. Sturges,** traffic manager of the Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., died after a short illness on June 27. He had been associated with the company for 33 years.

Bethlehem Leads In Defense Orders

Washington

• • • **Bethlehem Steel Co.,** holds the largest volume of War and Navy Department defense contracts ($927 million) at the end of May, according to the OPM Bureau of Research and Statistics.

The next largest volume of supply contracts was held by the New York Shipbuilding Corp., the total being $507,000,000. General Motors Corp. ranked third with $490,000,000 and Curtiss-Wright Corp. fourth with $444,000,000. Fifth in order was Newport News Shipbuilding & Dry Dock Co., with $389,000,000 and ranking sixth was E. I. du Pont with $318,000,000. The War and Navy contracts accounted for 75 per cent of the total defense contracts, which OPM said, totaled $50,785,000,000 last Friday.

Contracts with the United States Steel Corp. at the end of May totaled $209,000,000; Bath Iron Works, $166,500,000; Ford Motor Co., $128,500,000; Consolidated Steel Corp., $98,200,000; Baldwin Locomotive Works, $82,600,000; American Car & Foundry Co., $81,200,000; Chrysler Corp., $74,000,000; Packard Motor Car Co., $63,800,000; American Locomotive Co., $51,300,000; Williamette Iron & Steel Corp., $25,700,000; Crucible Steel Co. of America, $25,500,000.

The total of United States Government appropriations and contract authorizations, plus funds made available to the RFC for defense, came to $47,116,000,000 and British orders as of June 15, 1941, totaled $3,669,000,000.

The breakdown for United States and British commitments in this country shows that $11,957,000,000 has been allocated for airplanes; $8,483,000,000 for naval vessels, merchant ships and transportation equipment; $8,081,000,000 for guns and ammunition; $5,530,000,000 for industrial facilities; $4,353,000,000 for posts, depots and other non-industrial construction; $4,000,000,000 for other equipment and $8,381,000,000 for miscellaneous items.

Die Typing to Speed Production

(CONCLUDED FROM PAGE 37)

correspondingly shaped recesses in the retainer block are held by friction satisfactorily.

Before the inserts are mounted in their retainer blocks, they are suitably hardened in any conventional manner. They are then ready for use in production.

Die Steel

In most instances, any hot working die steel found acceptable in normal forging practice can be typed or forged also. Some materials present difficulties, but at present the process is being used successfully to type tungsten steel to form dies for automobile front axles; also, steels with high carbon and high chromium content—tougher than usual steels at high temperatures—have been typed successfully for several years. Most of the experience in applying the die-typing process has been with nickel - chrome - molybdenum die steel.

Wherever special die steels have been specified it has been possible to provide necessary metallurgical control to type the material successfully.

Typical analysis of a die steel used regularly for typing dies is: carbon, 0.47 to 0.55 per cent; manganese, 0.50 to 0.60; chromium, 0.60 to 0.75 per cent; nickel, 1.50 to 1.75 per cent; silicon, 0.10 to 0.20 per cent; sulphur and phosphorous, 0.04 per cent or less.

For severe usage in multiple cavity upset forging machines, die blocks have been made from straight 3.5 per cent chromium steel containing from 0.60 to 0.75 per cent carbon; 0.30 to 0.40 per cent manganese, and 0.10 to 0.20 per cent silicon. Forging temperature of the die steel for typing is 2250 deg. F.

Ed. Note: Next week the author concludes with specific data on control of surface conditions, particulars about draft angle and shrink, size limitations, hammer technique, life of dies, etc.

Metallographic Examination Standardized

(CONCLUDED FROM PAGE 43)

reliable relation between the different properties of steel is borne out by tests in which satisfactory fractures are found to have unsatisfactory grain structure.

The SMS 4.00.0 (see Fig. 8) gives the standard structure for hardening. On standardization throughout the plant, the heat-treating department can be informed by quoting a number of the treatment required to arrive at the microstructure aimed at.

Surface Classification

Surface is considered very important in modern work—it is most important wherever dependability can only be expected under certain surface conditions. Demands on surface appearance are often too exacting and tests regarding surface wear are rarely carried out after or during service. Also, surface conditions are often not viewed from a technical but rather from the appearance viewpoint and are consequently better finished than necessary. Surface phenomena must be observed better and more thoroughly to determine the influence of micromechanical fatigue and corrosion. To this end the preparation of a suitable series of photographs in definite magnifications is a most useful means of establishing contact between construction and manufacture and between manufacture and control. The series shows surface in plan and view—light and dark field investigation.

Decarburization, destruction or tempering phenomena of the surface may be examined through the inspection of cross-sectional microcuts, preserving a clear cut edge. For this reason the specimen is cast in Woods metal or a copper surface is deposited electrolytically. With increasing hardness of the material the protective surface should become harder too.

Also nickel or chrome plating has been tried successfully, but only if no special preparation of the specimen is required. The microscope will give all the information required as to the quality of the surface or the grinding and lapping process. Fig. 9 shows the SMS of ball bearing surfaces. These photos were taken in the plant.

In concluding the author discusses the merits of magnaflux testing, the importance of testing for hardening structures, especially of case hardened steels, and fatigue testing. Regarding practical results obtained with the SMS, the author claims that at Schweinfurt rejections after polishing ball races have decreased by 65 per cent since the introduction of routine tests for the purity of the material. Also, the divergence of the span of life of bearings has been greatly reduced. While in 1920 in fatigue tests the shortest life of a bearing was found to be 1000 revolutions and the longest 1,000,000, a ratio of 1:1000, in 1930 this relation was narrowed down to 1:60 and in 1940 to 1:30. Thus the practical importance of continued and extended testing and the advantages of standard series as a means of saving time and costs become evident.

Importing Russian Chrome, Manganese Ore Studied

• • • **Administration trade experts** this week were studying the possibilities of resuming importation of Russian manganese and chrome but admitted that the volume of such imports would be largely determined by Russian transport facilities.

From 1939 through 1940, this country bought about 100,000 tons of manganese from Russia, or about 40 per cent of aggregate manganese imports. Such ore was last received from Russia in October. No imports of Russian chromium have been recorded since 1936 but previously the United States bought about 1000 tons annually.

New Bronze Foundry To Make Propellers

• • • **A slow-down of production** of machine parts for the Navy has resulted from a contract dispute between the Federal Mogul Corp. and the UAW-(CIO) according to the National Defense Mediation Board which has certified the dispute to the Labor Department. The union seeks a contract with Federal Mogul to cover a new plant at Greenville, Mich., which will manufacture propellers and other marine parts. The new bronze foundry at Greenville will manufacture propellers and other marine equipment for the Navy.

U.S. Steel Profit Is $24,814,751— Shipments at Peak

• • • **U. S. Steel Corp.** this week reported for the second quarter of 1941 a net income, after taxes, depreciation and interest, of $24,814,751, or $2.12 a common share, compared with a profit of $36,557,995, or $3.47 a share, in the first quarter. Net profit in the second period of 1940 was $19,201,008.

Finished steel shipments for U. S. Steel subsidiaries in the second quarter totaled 5,101,606 net tons, an all-time high, compared with 4,951,271 tons in the first three months of the year, a gain of 3 per cent, while second quarter operations averaged 102.4 per cent against 100.6 per cent in the preceding quarter.

The company's directors, meeting on Tuesday, declared a $1 dividend on common stock, payable Sept. 20 to stock of record Aug. 20, and the usual $1.75 on preferred, payable Aug. 20 to stock of record Aug. 1. Capital outlay for the second period, less credit for property sold, was $44,200,000. A special tax reserve set up for the second quarter was $52,958,292, compared with $22,603,379 in the first three months of 1940.

Youngstown Sheet & Tube Co. reports a second quarter net profit of $4,765,996, the best quarter for the company since the first period of 1937. First quarter earnings were $4,576,197, and the 1940 second quarter figure was $998,756.

Jones & Laughlin Steel Corp., Pittsburgh, reports for the quarter ended June 30, a consolidated profit for the corporation and subsidiaries of $3,937,720. This compares with a profit of $2,141,645 in the same quarter last year. Consolidated profit for the first six months of this year was $8,098,227, compared with $3,276,256 in the first half of last year.

American Rolling Mill Co., Middletown, Ohio, reports second quarter profits of $3,068,735, after deduction of possible tax increases. First quarter earnings were $3,599,241. Net income for the first half of the year was $6,667,976, compared to $2,084,599 for the same period of 1940.

Allegheny Ludlum Steel Corp., Pittsburgh, reports net earnings for the second quarter, after provision for normal Federal and excess profits taxes, but without providing for increased taxes, of $1,449,183. This compares with $1,008,121 for the second quarter of 1940. Earnings for the first six months of this year are $4,169,347, equivalent to $3.22 per share of common stock. Earnings in the comparable period of 1940 were $1,893,291.

Crucible Steel Co. of America, New York, reports net profits for the first six months of $2,358,412, including provision for anticipated tax increases and deduction of $500,000 for extraordinary contingencies. This compares with net income of $1,817,293 for the first half of 1940.

Alan Wood Steel Co., Conshohocken, Pa., reports consolidated profits for the company and its subsidiaries for the second quarter of $283,266, not including possible tax increase deduction. Earnings for the first quarter were $473,749. The figure for the first six months of 1941 is $757,060, compared to $521,558 for the first half of 1940.

Acme Steel Co., Chicago, earned $920,707 for quarter ending June 30, 1941. This compares with earnings of $661,149 for same quarter in 1940.

National Acme Co., Cleveland, reports net profit of $651,334 for the second quarter of 1941, including deduction of estimated increased taxes. Earnings for the first six months were $1,572,467, equal to $3.14 a share and a new peak. Earnings for all of 1939 were $578,994.

Rustless Iron & Steel Corp., Baltimore, for the second quarter reports a net profit of $582,762, compared with $581,697 for the first quarter. These figures include reduction of estimated tax increases. Profits for the first six months of the year were $1.164,460, compared with $430,537 for the same period of 1940.

A. M. Byers Co., Pittsburgh, reports net profit for the second quarter of 1941 of $336,951, before provision for excess profits taxes, compared with a first quarter figure of $290,561. Earnings for the twelve months ended June 30 were $1,155,074, compared with $653,262 for the preceding twelve months.

Keystone Steel & Wire Co., Peoria, Ill., reports a net profit for the fiscal year ended June 30 of $1,618,375, equivalent to $2.13 a share on outstanding stock. It compares with earnings of $1,418,221 for the preceding fiscal year.

Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., for the six months ended June 30 reports a profit of $281,236, after provision for estimated tax increases. Earnings for the first half of 1940 were $572,543. Indicated earnings for the second quarter of 1941 were $351,105.

Interlake Iron Corp., Chicago, reports earnings for the second quarter of $524,469, including reduction of estimated tax increases, compared to $774,855 for the first quarter. Profits for the first half of the year are $1,299,324. For the corresponding period of 1940 the company reported a net loss of $255,512.

Detroit Steel Corp., Detroit, reports earnings for the second quarter of this year of $197,869, compared with $233,767 for the first quarter. Profit for the first half of 1941 was $431,636, and for the corresponding period of 1940 $209,939.

Harvester Wages Lifted

Chicago

• • • **A second 5c.** an hour wage increase, identical with one given last April 14, has been made available to 55,000 employees of the International Harvester Co. Simultaneously, salary adjustments for clerical and salaried help were announced. Increase became effective on July 21 at the company's non-union plants. Union officials announced they would accept the increase for their plants but that they would continue their negotiations for further wage adjustments.

St. Lawrence Seaway Seen Harmful to U. S. Steel Trade

Washington

• • • **Alexander C. Brown**, vice-president of the Cleveland Cliffs Iron Co., told the House Rivers and Harbors Committee on Tuesday that completion of the projected Great Lakes-St. Lawrence Seaway would open the way for the importation of foreign ores and steel products "produced with cheap foreign labor transported on foreign boats."

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	July 29, 1941	July 22, 1941	July 1, 1941	July 30, 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	July 29, 1941	July 22, 1941	July 1, 1941	June 30, 1940
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$24.84
No. 2, Valley furnace	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Basic, Valley furnace	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh	$20.00	$20.00	$20.00	$18.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	17.25
Carwheels, Chicago	....	....	....	19.00
Carwheels, Philadelphia	....	....	....	20.75
No. 1 cast, Pittsburgh	22.00	22.00	22.00	19.75
No. 1 cast, Philadelphia	24.00	24.00	24.00	21.25
No. 1 cast, Chicago*	21.00	21.00	21.00	16.75

*Changed to gross ton basis.

Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$6.125	$6.125	$6.125	$4.25
Foundry coke, prompt	6.875	6.875	6.875	5.25
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro, Conn.*	12.00	12.00	12.00	11.50
Copper, Lake, New York	12.00	12.00	12.00	11.50
Tin (Straits), New York	54.50	53.75	52.875	52.50
Zinc, East St. Louis	7.25	7.25	7.25	6.25
Lead, St. Louis	5.70	5.70	5.70	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 112-118 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 29, 1941	2.261c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.261c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.261c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.261c. a Lb.	$22.61 a Gross Ton	$18.17 a Gross Ton

	High	Low	High	Low	High	Low
1941			$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.261c., Jan. 2	2.211c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Five companies to build new blast furnaces under OPM pig iron capacity expansion . . . Ingot output down a half point to 99 per cent . . . Steel companies start community collections to help meet scrap shortage.

STEEL orders received in July were slightly ahead of the heavy volume booked in June and the steel industry again set new high production records in most departments in an effort to meet national defense needs. Steel ingot output is closing the month at 99 per cent of capacity, a half point drop under last week's rate as a result of equipment breakage at a medium sized plant, but at a level of activity which American steel plants have never before reached during the summer months of a peacetime year.

Details of the Office of Production Management's plan for an 11.2 per cent increase in the industry's existing pig iron capacity of about 58 million tons yearly, indicate that new blast furnaces will be allocated to five companies. This allocation is said to provide four new furnaces at Cleveland, Youngstown, Birmingham and Gadsden (Ala.) plants of Republic Steel Corp.; two furnaces at Inland Steel Co.'s Indiana Harbor, Ind., plant; one each at Bethlehem Steel Co.'s Johnstown, Pa., and Lackawanna, N. Y., plants; one at Carnegie-Illinois Steel Corp.'s plant at Braddock, Pa.; one such furnace at the plant of Colorado Fuel & Iron Co., Pueblo, Colo. In addition, three more blast furnaces, taken from other steel centers, are to be erected at Provo, Utah, where Columbia Steel Co., U. S. Steel Corp. subsidiary, already has one stack.

Building of the new blast furnaces, plus enlargement of existing furnaces, will increase pig iron capacity in the United States by 6,508,950 tons at a cost of more than $150 million which will come, for the most part, from the Defense Plant Corp., RFC subsidiary. The problem of getting the necessary steel, equipment, and labor for carrying out the blast furnace program has been left largely to the steel manufacturers.

WHILE the blast furnace program will provide a long range answer to some material shortages which are now hampering steel production, the steel industry this week faces possible shutdowns or partial curtailment of melting schedules due to the ever-threatening lack of scrap. Illustrating the severe need for increased scrap supplies are steps taken by American Rolling Mill Co. and Wheeling Steel Corp. in organizing community drives for collecting scrap.

At Portsmouth, Ohio, Wheeling Steel this week lost about 1300 tons of ingots due to its inability to obtain the type of scrap needed to maintain maximum output of its furnaces. At Columbus, Ohio, a government-sponsored meeting finally reached the point of debating means of speeding up the scrapping of automobiles, a step recommended some time ago by the scrap trade.

The steel industry still is looking to Washington, which has assumed complete control over the scrap situation, for quick action to prevent a decline in steel output. This week, however, estimates are being made that the national average of steel operations will decline as much as 10 points to around 90 per cent in the fall months as a result of the scrap shortage.

EMPHASIS in the OPM's new program for preventing another shortage of material, that of alloy steel for aircraft manufacturers, is likely to be placed on allocation of orders and on increasing heat treating and finishing capacity, rather than substantial enlargement of electric furnace capacity, which, so far in 1941, has already been increased by 400,000 tons to about 3,000,000 tons annually. The aircraft industry's fabricated alloy steel requirements through the end of 1942 have been closely calculated.

Allocation of about 55,000 tons of plates for a midwest pipeline was reported to have been made by the OPM at the week's start. The line will carry an A-5 priority. Orders for railroad rolling stock continue at a high rate with 2300 freight cars and 50 locomotives placed compared with 1300 freight cars and 50 locomotives ordered last week. Reinforcing steel awards gained sharply to 22,500 tons, against 5650 tons last week, the outstanding letting being 6300 tons for Navy facilities on islands in the Pacific. New reinforcing steel projects, however, declined to 11,100 tons from 24,925 tons a week ago.

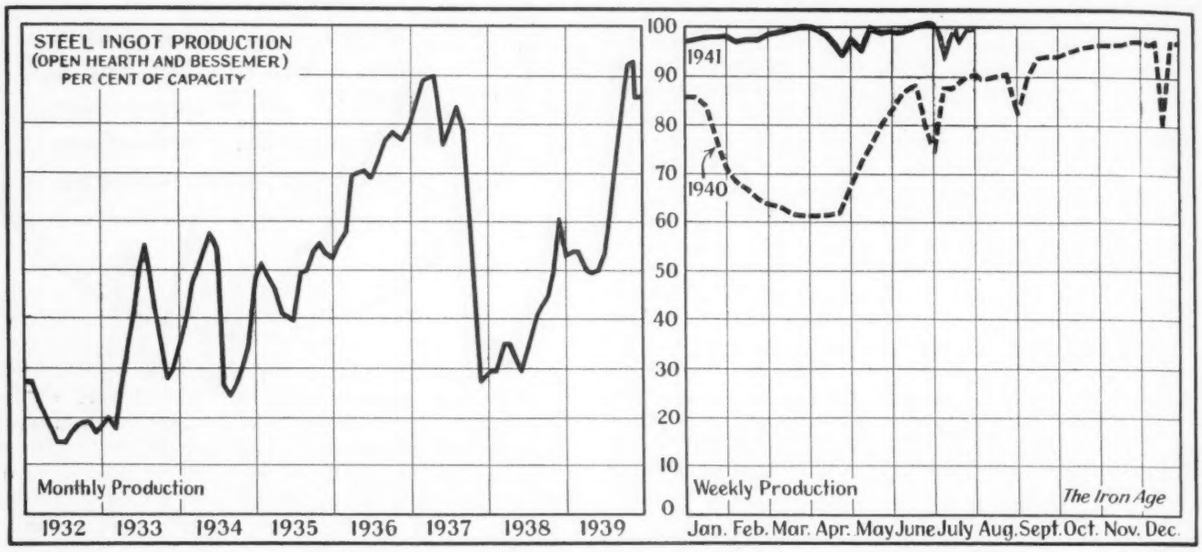
Fabricated structural steel awards, according to THE IRON AGE tabulation, declined to 14,200 tons this week from 39,950 tons in the preceding seven-day period, with the largest project being 6000 tons for the Philadelphia Electric Co.'s Southwark station at Philadelphia. New structural steel projects, which included 4500 tons for an Army airplane repair building at Rome, N. Y., dropped to 15,700 tons from 30,300 tons last week.

The Industrial Pace . . .

• • • **Heavy construction** awards, topping the $200,000,000-mark for the third consecutive week, continue to influence strongly THE IRON AGE index of capital goods activity which now stands at 126.7 per cent of the base years, gaining 3.5 points during the past week. The construction component gained 10.1 points over last week's figure, spiraling to 157.5 for a net gain of 37.1 points during July. The previous all-time monthly high for construction volume will probably be broken by the end of this month.

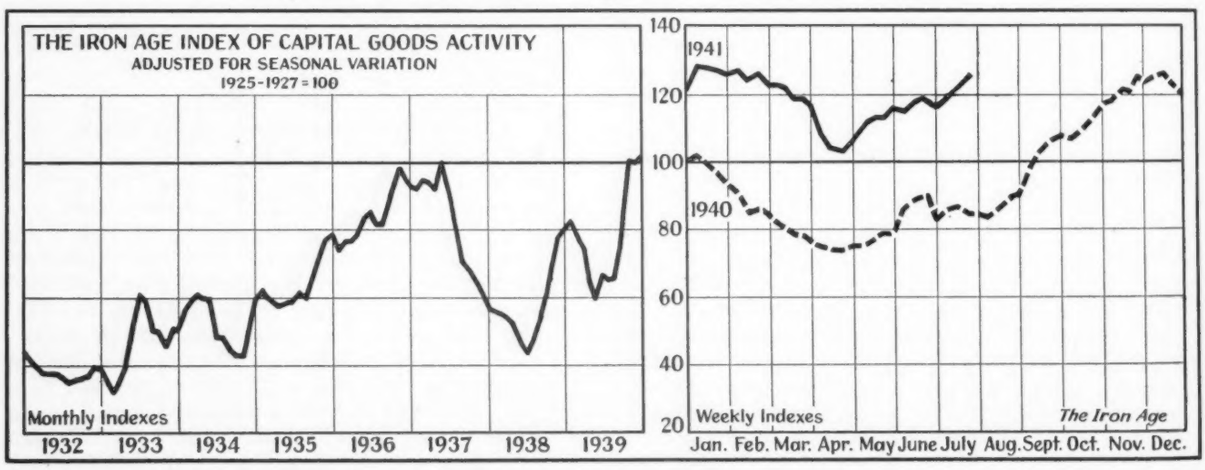
While automobile production declined in the past week, it is still considerably above normal output at this time of the year. Adjustments for seasonal decline more than offset the drop, raising this component 5.6 points to 116.6 per cent. With a general advance in steel mill operation, blast furnace activity, coal production, power production, and river and rail shipments, the Pittsburgh series gained 1.6 points to 132.3 in the week, and forest products carloadings, up 1.8 points to 85.6, reached a new 1941 high.

Operations Ease Half Point to 99 Per Cent


STEEL INGOT PRODUCTION
(OPEN HEARTH AND BESSEMER)
PER CENT OF CAPACITY
Monthly Production
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Production
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
100 90 80 70 60 50 40 30 20 10 0

District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week ..	100.0	101.0	99.0	97.5	100.0	88.0	90.0	103.0	95.0	102.0	102.5	111.0	95.5	99.0
Previous Week..	100.0	101.0	99.0	97.5	100.0	106.0	90.0	104.5	95.0	101.5	102.5	111.0	95.5	99.5

Capital Goods Index Up 3.5 Points to 126.7

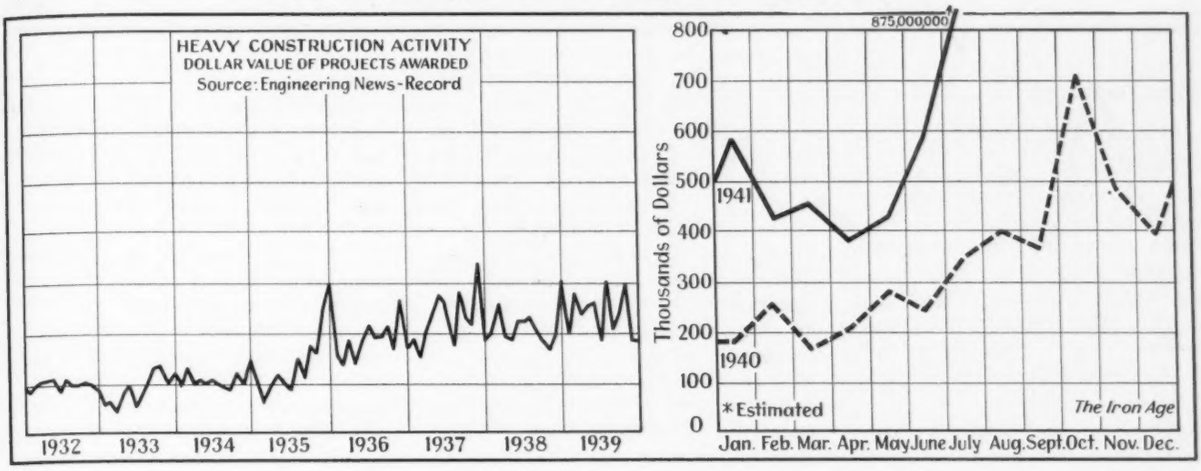

THE IRON AGE INDEX OF CAPITAL GOODS ACTIVITY
ADJUSTED FOR SEASONAL VARIATION
1925-1927 = 100
Monthly Indexes
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Indexes
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
140 120 100 80 60 40 20

Component — Week Ended →	July 26	July 19	June 28	July 27, 1940	July 27, 1929
Steel ingot production[1]	141.6	143.1*	147.5	125.6	139.7
Automobile production[2]	116.6	111.0	118.8	38.4	134.7
Construction contracts[3]	157.5	147.4	120.4	83.6	123.4
Forest products carloadings[4]	85.6	83.8	79.9	65.7	125.4
Pittsburgh output and shipments[5]	132.3	130.7	131.6	108.4	130.0
COMBINED INDEX	126.7	123.2*	119.6	84.3	130.6

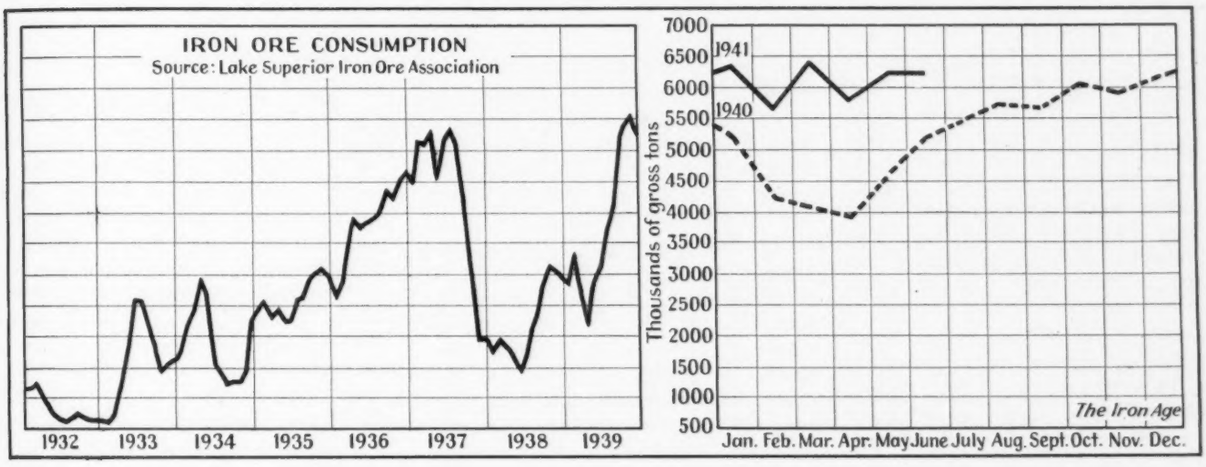
*Revised.

Sources: [1] THE IRON AGE; [2] Ward's Automotive Reports; [3] *Engineering News-Record;* [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended July 19. Other indexes cover week of July 26.

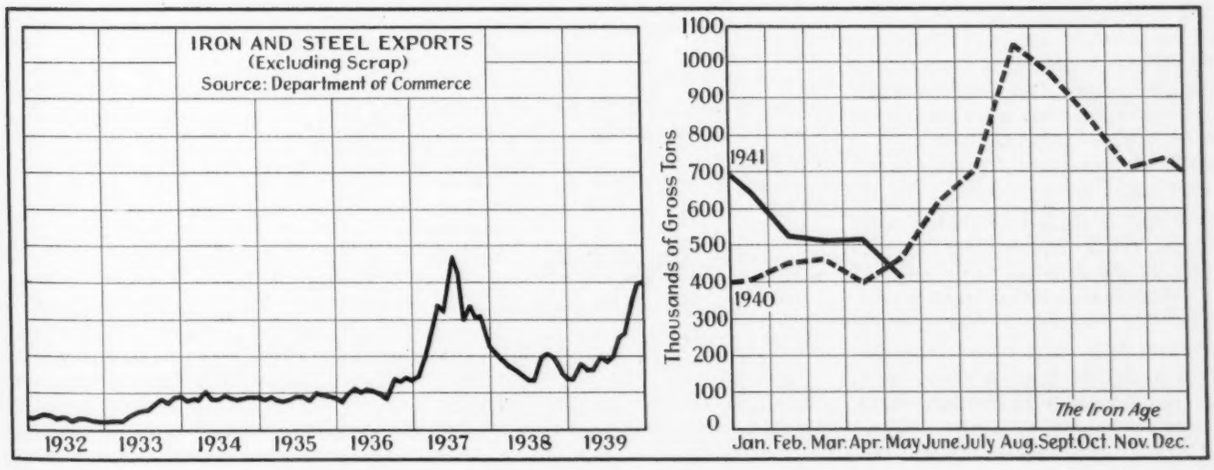
July Building Awards May Set New High


HEAVY CONSTRUCTION ACTIVITY
DOLLAR VALUE OF PROJECTS AWARDED
Source: Engineering News-Record
1932 1933 1934 1935 1936 1937 1938 1939
875,000,000
Thousands of Dollars
800 700 600 500 400 300 200 100 0
1941
1940
* Estimated
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Iron Ore Consumption Declines Slightly


IRON ORE CONSUMPTION
Source: Lake Superior Iron Ore Association
1932 1933 1934 1935 1936 1937 1938 1939
Thousands of gross tons
7000 6500 6000 5500 5000 4500 4000 3500 3000 2500 2000 1500 1000 500
1941
1940
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

May Steel Exports Lowest Since April, 1940


IRON AND STEEL EXPORTS
(Excluding Scrap)
Source: Department of Commerce
1932 1933 1934 1935 1936 1937 1938 1939
Thousands of Gross Tons
1100 1000 900 800 700 600 500 400 300 200 100 0
1941
1940
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . July bookings top June's for Cleveland mills

July in the steel industry at CLEVELAND is ending with new business definitely ahead of the very large June volume, the gain being caused by heavy British and domestic specifications. Defense shipments have reached a new peak, but are still well below the level that is bound to come.

During the past week a large plate tonnage for use in pipeline fabrication, and a big direct government award for armor plate were among the chief items of interest at CLEVELAND.

All mills continue in a bad position on scrap supplies. This may lead to a pronounced drop in ingot output in the early fall. It is doubtful now in the minds of some experts whether enough additional scrap material can be found, and whether it can be moved quickly enough to hold up the present level of steel operations. Meanwhile, the pig iron picture, closely related to scrap, is becoming tighter and tighter.

Orders were off again last week in CHICAGO and the month closed from 15 to 20 per cent under June. Some consumers report that steel can be bought from brokers at slightly higher prices but this is almost entirely rejects. Steel mill operations there will fall off soon if more scrap is not incoming. Structural projects are declining, while defense orders and inquiries for concrete bars are on the ascension. Some mills may soon open their books for 1942 listing but if this is done all orders will be subject to defense requirements, anyway. Defense orders for alloys are increasing.

The major share of new steel business being entered by PITTSBURGH producers is for defense and is tagged with a preference rating. Steel buyers in the strictly non-essential groups have virtually vanished from the market, but there is still considerable pressure from buyers seeking to place orders for uses not enjoying priorities yet considered indispensable to general defense activity. Steel makers here are taking cognizance of this type of requirements, but the unrelenting shift of orders to high priority ratings, and an increasing volume of preferred tonnage which must be definitely scheduled for later delivery, is cutting further into much civilian tonnage on steel mill order books. Some cancellations for sheets for distant delivery to the motor-car industry are reported, but a marked decline in the current movement of steel in that direction has not set in thus far.

New bookings in the Philadelphia area are running close to twice the tonnage of shipments coming into the district.

National defense production alone is reported to be taking from 80 to 90 per cent of steel production in this area, while one mill reported that their efforts have been along lines to aid the railroads in securing steel for locomotive and car building.

With steel requirements for national defense projects in the Southeast mounting week by week, backlogs at BIRMINGHAM mills continue to increase. Heavy demand for plates is unabated. On orders carrying high priority ratings, fabricators report they are able to obtain delivery on structurals in from four to four and a half months after the orders have been placed.

Orders booked in the last week at BUFFALO are slightly less than production totals. Sales officials assert they are turning down an increasing amount of new business from non-defense buyers in an effort to maintain their order backlogs as much in line as possible with actual production.

Semi-Finished Steel

. . . Priorities expected on material for non-integrated mills

The expectation is strong that the OPM will soon extend priorities to non-integrated steel mills for such semi-finished steel as is necessary to fulfill requirements for finishing against preference rating orders held by detached mills. Thus far, non-integrated mills deluged with defense orders taking priorities have been forced merely to "reflect" the priority character of these orders when trying to obtain semi-finished steel. Although no serious delays in production at detached mills have been reported, it is evident that the pressure of this group for the benefit of priorities is indicative of their own production problems stemming from increased defense business. Extension of priorities on semi-finished steel may tend to upset some reciprocal arrangements affecting scrap.

Sheets and Strip

. . . OPM-APACS dispute clouds automotive steel outlook

The conflict of authority between the OPACS and OPM is delaying the lining up of likely automotive sheet and strip requirements beyond August and September. Some order cancellations for sheets are reported, in the Pittsburgh district, for rather remote deliveries. Up to the present, however, there has been no marked retrenchment in automotive specifications. Some producers report the amount of priority business is creating further dislocations in production schedules. Increases in such tonnage are particularly noted in heavy hot-rolled sheets, and the necessity for scheduling heavier production of these grades is making sharp inroads into the output of cold reduced tonnage. In fact, some mills have practically reached the limit of hot-rolled production on defense business. In proportion to total sheet and strip production, the tonnage of plates being rolled on high-speed mills is said to be relatively small thus far.

Except for the trend toward more defense production from all rolling mills, there was not much change in the sheet and strip picture at CLEVELAND during the past week. Heavy black sheets remained predominant among outgoing ton-

nage. Faced with the likelihood of additional large plate allocations (see Plates) continuous mill schedules at CLEVELAND held every prospect of becoming tighter and tighter. One hand mill has been turning out around 5500 tons per month regularly recently.

Estimates that as much as 40 per cent of CHICAGO'S sheet production has been converted to plates are heard. The actual figure probably is lower than this but more important conversion moves will be made there.

Steel Production

. . . Buffalo accident lowers ingot rate to 99 per cent

Steel ingot production this week as estimated by THE IRON AGE will be at 99 per cent of capacity, a decline of half a point from a week ago. The week's loss was due largely to a drop in the Buffalo rate from 106 per cent a week ago to a tentative 88 per cent this week. A mill accident at the Buffalo plant of Wickwire Spencer forced a shut down there of all four open hearths and caused the district's rate to fall below 100 per cent for the first time since last August. Repairs are being rushed, however, and it is hoped to have all furnaces back in operation before the end of the week.

Pig Iron

. . . Steel-making iron tightest spot at Pittsburgh

Pig iron sales offices in the PITTSBURGH area report an increasing volume of inquiry from more distant consuming points. Some of these inquiries reflect and affirm reports that the flow of pig iron is scarcely equal to peak steel mill and foundry requirements. The tightest spot continues to be in the available production and supplies of steel-making iron which, in the PITTSBURGH area, is just about holding its own in the face of 100 per cent open-hearth and Bessemer operations. The foundry situation, while not all that could be desired, is noticeably less stringent than in basic and Bessemer iron. The movement of export pig iron from this and adjacent producing points is picking up, the increase being ascribable to more bottoms currently available for British delivery.

Structural Bookings Gain Sharply in June

• • • New bookings of fabricated structural steel in June rose sharply to 245,255 tons from 175,255 tons in May, but were still below the year's high mark of 281,233 tons booked in January, the American Institute of Steel Construction reports. In June, a year ago, new bookings were 109,744 tons. New business in the first six months of the current year totaled 1,298,432 tons, or more than double the 619,231 tons booked in the comparable period of 1940.

Structural shipments in June were 184,095 tons, as compared with 186,717 tons in May and 119,087 tons in June, 1940. Shipments in the first six months of the present year amounted to 1,055,946 tons against 655,012 tons in the comparable period of 1940. Tonnage available for fabrication over the next four months was reported at 747,424 tons.

No action on allocations is reported thus far, but pig iron sources at PITTSBURGH believe priorities are virtually inevitable within a short time.

Blast furnaces are being crowded as never before, reports CLEVELAND, yet demand has risen to such an unprecedented level that apprehension is felt more keenly than ever over pig iron supplies. The acute scrap scarcity, affecting both foundries and steel plants, remains the chief cause of the critical pig iron picture. Increased production for Great Britain is another factor. Still another angle affecting long distance shipments arises from depletion of producer inventories, which means that production iron is at higher cost, forcing cessation of freight absorption by makers.

At the start of this week the new governmental control over shipments was still expected to be announced momentarily. In order to put the plan into action for September barely sufficient time remained. Under the plan contemplated, foundries were to be given up until the fifth of each month to make their returns. Producers were to be given an additional short time to report to Washington and then by the 20th of each month final schedules were to be back in the hands of each producer, enabling about ten days' start on the next month's production.

At BUFFALO the Donner-Hanna Coke Corp., this week announced it has been forced to give up practically all of its domestic coke business to meet blast-furnace demands. Donner-Hanna's sales of coke for domestic use normally amount to 25 per cent of a total annual production of about 1,000,000 tons. About 50,000 tons of coke monthly are being brought into this city to meet the needs of the booming blast-furnace industry, now operating at 100 per cent capacity for the first time since the World War. Bethlehem next week will complete construction of a battery of 76 new coke ovens which will add 32,000 tons a month to the local supply. Donner-Hanna announced early this year it was considering expansion but no definite decision has been made.

Foundries in the BUFFALO district are all clamoring for pig iron. Merchant iron manufacturers are not supplying as much pig iron as foundries want but are providing enough to keep all operating at capacity. Not a foundry in the district now has a reserve supply of iron in its yards, according to a reliable source here.

With unconfirmed reports being heard at BIRMINGHAM that additional blast furnaces may be built there, the tight situation on iron in that district shows no signs of being relieved by any diminishing demand. Producers are endeavoring to turn out every pound that can be obtained from the 17 furnaces in blast.

Although pig iron stocks of SOUTHERN OHIO melters are below normally accepted proper inventory levels, no curtailment in the melt is yet noted. Furnace representatives are still waiting word from Washington as to what method of insuring flow of material is to be adopted, that is, pooling, priorities or the present arrangement. With the blast furnaces at the Hamilton Coke and Iron unit of American Rolling Mill Company running full to supply metal to Butler as well as to Middletown, the merchant market is not likely to get any relief from this source.

Continual increased demands for pig iron in the EASTERN PENNSYLVANIA district is gradually making the supply problem more acute. One

foundry was reported down three days last week because of iron shortage. The Riddlesburg furnace, expected to go into production about Sept. 1, is considerably behind schedule due to the inability to secure necessary equipment.

Those New England furnaces having pig iron to sell report a tighter than ever situation. They say it is but a question of time when the scarcity of pig iron and scrap will begin to be reflected in New England's weekly production of castings.

Railroad Buying

. . . 50 locomotives, 2300 freight cars bought . . .

Orders for railroad rolling stock continued at the high rate set by the two preceding weeks with 2300 freight cars and 50 locomotives purchased in the past week, compared with 53 locomotives and 1300 freight cars reported a week ago.

Southern and its subsidiary lines Cincinnati, New Orleans & Texas Pacific, Alabama Great Southern and New Orleans Terminal bought 22 diesel-electric locomotives, placing 11 1000-hp. units with Electro-Motive Corp., and six 660 and three 1000-hp. engines with American Locomotive Co. Two units ordered from Baldwin were already reported.

Other locomotive orders were placed by Norfolk & Western with the company's shops for 10 mallet 2-8-8-2 units; Union Railroad four and Patapsco & Black Rivers two diesel-electric switches with Baldwin; Newburgh & South Shore four diesel-electric engines with American Locomotive Co., and Central of Georgia two diesel-electric units with Electro-Motive.

Freight car orders include the following: Chicago & North Western 700 box cars to American Car & Foundry; New York, Chicago & St. Louis 250 gondolas to Greenville Steel Car Co. and 100 automobile cars to Ralston; Missouri & Arkansas 100 box cars, Akron, Canton & Youngstown 15 and Minneapolis, St. Paul & Sault Ste. Marie five hoppers, all to American Car & Foundry. The Army has placed 68 ammunition cars with St. Louis Car Co. and 16 flat cars with Haffner-Thrall Car Co. Reading bought 200 tons of rails from Bethlehem.

Foreign purchases reported included South African Railways & Harbors, 1000 gondolas from Canadian Car & Foundry; Chilean State Railways seven electric switchers from Westinghouse and the Mysore Iron & Steel Works one 2-8-2 locomotive from Baldwin.

Fruit Growers' Express Co. is expected to place 900, possibly as many as 1500 refrigerator cars with company's shops at Indiana Harbor, Ind. The Army is inquiring for between six and eight steam locomotives of the 2-8-0 type and Richmond, Fredricksburg & Potomac for six units of the 4-8-4 type. The New York, New Haven & Hartford has applied to the Federal Court for authority to buy 20,000 tons of rails.

Rolling stock orders totaling $20,000,000 will be placed by Canadian National within the next two weeks. Equipment including box, flat, mail and gondola cars will be distributed among Canadian Car & Foundry Co., National Steel Car Corp. and Eastern Car Co. The new orders will provide work for the companies running into the next year. A large share of the materials required for this program is expected to be placed with United States' suppliers.

Tubular Goods

. . . One mill sold up for year ahead on cold-drawn tubes

All tube mills in the PITTSBURGH district are jammed with orders. Indicative of the strong shifting from so-called non essential orders to defense tonnage is the sold-up position of one mill for a year ahead, on cold drawn tubes, all of the tonnage being for the manufacture of shells, machine tools, aircraft and for the Naval and Maritime Commission shipbuilding programs which are taking heavy quantities of steam pipe and boiler tubes. Detached pipe mills are getting into high-speed production on shells, but larger production at some of these units would be possible if more semi-finished steel were available. Oil-country goods are moving in exceptionally heavy volume.

July bookings at CLEVELAND fell below the all-time peak set in June because of increased vigilance governing acceptances. Although mills are well sold out, particularly on electric weld units but not so much on merchant pipe as in other products, a brisk volume of "must" business carrying high priority ranking is expected over the next few weeks, following government recognition of maintenance and other requirements of oil companies. Details of the allocation of a large new line which will require plate sizes will be found in this issue under "Plates."

Plates

. . . 55,000 tons for pipe line reported allocated by OPM

Allocation of around 55,000 tons of plates for a big Panhandle-Eastern pipeline in the Middle West was reported to have been made by OPM at the start of this week. It was reported the tonnage would be divided between Republic Steel Corp., Inland Steel Co., Great Lakes Steel Corp., Jones & Laughlin Steel Corp. and Carnegie-Illinois Steel Corp. Plates 70 to 80 in. wide and 3/8 in. to 1/2 in. thick would be required. The line will carry A-5 priority rating and will be built by A. O. Smith Corp. Coming on top of heavy ship and railroad car tonnages, as well as a heavy flow of miscellaneous plate work, the nation's continuous mill capacities will be heavily engaged and shearing lines and slab supplies will be taxed. Quick delivery on the pipe line is desired, preferably before October. Around 11,000 tons of the above tonnage were believed allocated to the big continuous mill at CLEVELAND.

Indicative of the plate situation in CHICAGO is the case of the boiler manufacturer with an A-1-B priority for installations at the three aircraft engine plants being erected for Studebaker. His orders for, say 200 tons, are getting deliveries of 50 tons. Priorities within priorities about sums up the picture there as mills try to spread plate production to as many important defense projects as possible.

Two EASTERN PENNSYLVANIA mills report that plate orders were

received this week carrying AA-1 priorities, superseding all orders on hand, for repairs to ships in drydock.

Merchant Bars

. . . Some large buyers unable to fill defense requirements

The current record production of hot-rolled bars at PITTSBURGH mills is heavily earmarked for defense consumption. Some large buyers find it impossible to obtain bars in quantity sufficient to fulfill their own defense schedules. More shopping around is also required to find acceptance of orders not tagged with preference ratings. Bar producers are trying to apportion their output as equitably as possible to meet such indirect vital requirements as the manufacture of mine equipment and other products essential to general industrial activity. Bar mill backlogs are so heavy that orders for special grades are being pushed far back except in urgent cases. The recent published bar classification is reported to be proving satisfactory, with some producers achieving noticeably better production yields.

Tantamount to shutting off nondefense orders is one CHICAGO mill's announcement this week of carbon bar deliveries at 14 to 16 months. Bar tonnage there has crept up to the same stage as regards defense as have other steel items.

Bolts, Nuts and Rivets

. . . Bookings at Cleveland still exceed production

Orders haven't diminished at CLEVELAND and are still above production. Raw material difficulties seem to be increasing. Departments are changing sizes in rapid succession to keep in operation. A price advance of about 10 per cent initiated by an Eastern cap screw manufacturer was being studied but had not been followed at CLEVELAND late last week. Higher labor costs and higher raw material prices, the latter arising principally from enforcement of extras on wire, apparently forced the action by the Eastern maker.

Wire Products

. . . Scrap shortage to cut rod output at Portsmouth

Merchant products sellers at CLEVELAND report consumption still far exceeding production, while at the same time the raw material situation is becoming tighter, reflecting increased semi-finished shipments abroad. Many jobbers are finding it impossible to maintain any semblance of normal stocks. A bulge in government construction projects still overhangs the nail market.

With steel production at Portsmouth, Ohio, being curtailed because of scrap shortages, a reduction in the rod and wire output of this unit of Wheeling Steel Corp. is in the cards for this week, according to plant officials.

Shipbuilding

. . . Bids asked for Aug. 11 on 16 coastal tankers

Bids, which will be opened on Aug. 11, 1941, have been invited by the Maritime Commission for the construction of 16 small tankers. Known as coastal tankers, the vessels will be about 1830 tons deadweight and will have a capacity of 12,800 barrels.

Warehouse Business

. . . Hot-rolled inventories 50% below January at Cleveland

Stocks are lower and inquiries are higher at CLEVELAND. Inventories of hot rolled warehouses are 50 per cent below last January. The alarming shrinkage may tend to place mills in a more complicated position with small lot business. One warehouse in late July was obliged to lay off 15 per cent of its operating force through lack of material. The industry's unceasing efforts since the start of this year to demonstrate necessity for warehouses to defense officials appear likely to result in some kind of relief soon.

No. 24 galvanized sheets at CLEVELAND are now quoted at 4.75c., an increase of 13c., in lots up to 10 bundles. The only other bracket being quoted is 4.60c. for over 10-bundle lots. Previously there were four brackets. All galvanized sheet prices are now f.o.b. Cleveland, with elimination of the city and country classifications. Cold rolled sheets also are being quoted in only two classifications instead of four as previously, by some warehouses.

Tin Plate

. . . Heavy vegetable packs swell demand for cans

A record-breaking demand for sanitary cans for heavy, early vegetable packs in many centers is accounting for sustained pressure upon tin plate producers in the Pittsburgh area, whose output is strongly supported by specifications pouring in at about 90 per cent of total capacity. Cold reduction mills continue to run at better than rated capacity. The alternative use of terne plate for tin plate, as requested by the OPM some weeks ago, is, in some instances, accounting for a piling up of tonnage awaiting a let-up of tin plate schedules.

Reinforcing Steel

. . . Awards rise to 22,500 tons from 5650 tons a week ago.

Reinforcing steel awards this week jumped to 22,500 tons from 5650 tons last week. Outstanding lettings are 6300 tons for Navy facilities on Pacific Ocean Islands; 2860 tons at Huntington, W. Va., for the Guyandotte flood wall; 2200 tons at Seattle, Wash., for an Army warehouse; 1500 tons for an addition to the ammunition loading plant at Kingsbury, Ind.; 1230 tons for an ammunition depot at Milan, Tenn.; 1200 tons at Norfolk, Va., for the Yorktown Mine depot, and 1075 tons at North Sacramento, Cal., for a highway viaduct.

New reinforcing steel projects declined to 11,100 tons. The only new jobs of size are 6000 tons for the Metropolitan Life Insurance Co. housing project at San Francisco, and 1200 tons for an Army picric acid plant at Marche, Ark.

Structural Steel

Fabricated structural steel awards this week declined to 14,200 tons from 39,950 tons last week. New structural steel projects dropped to 15,700 tons.

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

July Machine Tool Orders Slightly Lower; Inquiries Gain

Chicago

• • • **Machine tool** orders in July were slightly under the previous month but inquiries were more active than they have been in recent months. New defense projects such as the new machine gun to be built at Rock Island Arsenal, expansion of Allis-Chalmers' defense orders, of Revere Copper & Brass, of Buick and Studebaker aircraft engine production, of Goss Printing Co., etc., are responsible for the sharp upsurge in machinery inquiries. Fortunately, tool builders are making pretty good deliveries now, and by and large, buyers in this district declare that they are receiving equipment on time.

It is generally accepted that Buick will have enough equipment for a pilot line by Oct. 1 and some even advance the thought that production will be in swing around Nov. 1. Some of Buick's machines are remaining in Flint where they were shipped for testing. This means that additional equipment has to be ordered since the trade understands that step-up in Buick's order will require some of the engine parts to be made in Flint and shipped here for assembly and testing. Studebaker's change to a smaller engine has not affected machines on order but has realigned small tool requirements.

Smaller machine tool purchasers still complain that their orders are not receiving the attention accorded major buyers. They complain that they can't get tools for immediate use while machines are standing on receiving platforms of other plants waiting for installation.

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Weigh Renewal of Selling Efforts

Cincinnati

• • • **Moderate let up** in the almost hectic demand for machinery was noted in this district during the past week. The slackening is especially noted in tools susceptible of production line manufacture. In fact, one source indicated that some sales pressure is being contemplated to stimulate more business for its production line machines. Since production has been steadily increasing, deliveries are reported to be possible on new orders for certain types of light and automatic tools this fall. This however, is probably exceptional, since the bulk of the industry has little available space in order books for the current year's production.

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Turbine Plant Allocates Orders

Cleveland

• • • **One of the largest** projects on which machine tool equipment was allocated in this area recently was the new government owned turbine plant at Erie. Around $2,000,000 to $3,000,000 in orders were allocated about ten days ago. The plant will make propulsion machinery for cargo vessels.

The swing toward the defense program is becoming much more noticeable in parts making shops throughout northern Ohio. Many are still turning out a lot of auto parts, however. The wind-up of shell purchases from the 1940 appropriation is expected in the near future and may necessitate some new equipment. That the government may preempt machine tools on a much more elaborate scale seems to be a foregone conclusion.

May Industrial Machinery Exports 11% Less Than April's

• • • **United States exports** of industrial machinery in May were valued at $36,508,559, a decline of 11 per cent from the April figure of $40,963,265, the Department of Commerce reports. Decrease in shipments of metal-working machinery more than offset increases in power-generating, construction and conveying equipment. Machine tool exports, amounting to $14,389,047, compared with $19,-021,589 in April, dropped to the lowest value since July, 1940.

April and May figures for various types of equipment were:

	May	*April*
Machine Tools		
Milling machines	$2,950,349	$5,285,184
Lathes	2,414,299	3,503,755
Drilling machines	676,436	1,112,884
Grinding machines	2,061,239	2,428,440
Other Metal Working Machinery	2,758,088	3,359,743
Sheet and plate working machinery	1,065,306	1,429,735
Forging machinery	825,570	902,601
Rolling mill machinery	227,136	208,001
Mining, Well and Pumping Equipment	3,249,537	3,557,340
Mining and quarrying machinery	1,209,803	1,253,429
Well and refining machinery	1,213,310	1,416,461
Pumping equipment	826,424	887,450
Construction and Conveying Machinery	3,358,836	2,772,473
Excavators and parts	489,771	371,220
Road graders and scrapers	748,278	540,412
Conveying equipment	395,813	341,836
Cranes, hoists and derricks	405,643	679,978

MICHIGAN TOOL's new plant: Production of cone-drive gearing is now under way in this new two-floor addition of Michigan Tool Co., East McNichols Road, Detroit. Included in the plant equipment is a cone-drive gear generator capable of producing worm gearing of the highest capacity ever known.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

OPACS Threatens Tin Price Ceiling

• • • **Threatened OPACS price** control on tin, OPM request to reduce tin purchases, expected OPM 100 per cent control of copper, the announcement of a joint copper-zinc advisory committee, and August lead allocations awaiting return of OPM questionnaires summarize this week's news of the non-ferrous industry.

Tin, one of the few remaining commodities not subject to OPM and OPACS restrictions, faces control from both groups. Recent sharp increases in tin prices due to developments in the Far East may force OPACS to impose a price ceiling on the metal, Administrator Henderson announced. Unless prices stabilize quickly around the 50c. a lb. buying level of the Metals Reserve Co., a price schedule may be expected. Tin consumers, OPM announced, are asked not only to refrain from increasing their tin stocks, but also to cease replacing their current consumptions until such time as the increase acquired by them since June, 1940, is reduced by one-half.

The copper industry awaits certain 100 per cent control of copper and the appointments to the new OPM joint copper-zinc industry committee, which will consist of from 35 to 40 members. Consumers are especially interested in whether an appointment will be made to look after their interests, since production and large fabricator interests will be naturally represented. Regulations on copper are expected to be made known at any time and to probably become effective August 1.

Zinc interests are somewhat apprehensive of the new joint copper-zinc committee, feeling that the volunteer zinc committee has done an excellent job during a most critical period and that zinc has nothing to gain by the appointment of this new control group.

Foreign lead purchased by Metals Reserve Co. is reported moving satisfactorily, and July allocations have been completed, leaving it only a matter of delivering the metal. Questionnaires have been sent to consumers, and August allocations will be considered as soon as returns make it practical to work on the matter. Consumers will aid those in charge of allocations and facilitate getting their supplies by returning these questionnaires promptly. Lead shipments dropped from 69,382 tons in May to 57,969 tons in June, while production dropped from 60,609 tons in May to 48,224 tons in June, the lowest since last August. However, with increased foreign lead supplies, both shipments and production will probably rebound during the next month.

Expansion of Canadian copper, lead, and zinc production is under consideration, stimulated by the announcement that United States is seeking large quantities of base metals materials from Canada. Arrangements have already been made to take some 30,000 tons of lead from the stock piles of Consolidated Mining & Smelting Co., and a further 5000 to 6000 tons a month out of production.

Prices were generally stable in the market this week, with tin being the only metal to show fluctuations. Lead prices were 5.70c. a lb. at St. Louis and 5.85c., New York. Copper prices were unaltered at 12c. a lb., Connecticut Valley, quoted by producers, and 12½c. by custom smelters. Zinc prices remained at 7.25c. a lb., East St. Louis, and 7.60c., New York. The tin prices, hit by the latest Japanese moves, worked up to 54½c.

O. H. Scrap Refining Speeds Alloy Output

Cleveland

• • • **Refining scrap steel** in open hearths prior to its use in electric furnaces was inaugurated roughly a year ago by Republic Steel Corp. and has proved highly successful. While the process is costly, the expense is offset partially by the fact that it puts to use scrap which otherwise would not be used and shortens the time required for an electric furnace heat.

Better control over analysis is the biggest feature of the refining process. Specifications on electric furnace grades are so strict that production men must be sure of what they are charging. Carbon, chrome, molybdenum and nickel scrap can be refined. The amount of nickel remaining after the refining process is very low, however, and most of the chrome is lost, the latter being a valuable feature from the standpoint of the electric furnace operator.

It is possible for some heats to go direct from the open hearth to the consuming trade, providing the analysis happens to coincide with the consumer's requirements. At Canton where two open hearths normally are occupied in refining scrap for electric furnaces, from two to four hours can be saved on the electric furnace heat. The refining process can't be used in the making of stainless steel, however.

All over the nation the trend toward making more alloy steel in open hearths has been given a boost by the requirements of the defense program. One subsidiary of U. S. Steel Corp. is now able to supply from open hearth furnaces all analyses up to stainless steel. Previously much of the alloy steel below stainless sold by this company had been coming from electric furnaces.

At an eastern plant stainless is reported to have been produced in open hearths on an increasingly larger scale recently.

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

• • • **This week the** widely-publicized shortage of scrap, with its threat to continued capacity operation of steel plants for national defense, grew more critical, while to some observers, faced with the prospects of shutting down due to lack of scrap, the defense agencies appeared slow in taking action to meet the emergency.

Typical of the desperate need of greater scrap supplies is the action taken by American Rolling Mill and Wheeling Steel in organizing community drives for collecting scrap. At Portsmouth, Ohio, Wheeling will lose about 1300 tons of ingots this week, according to trade reports, due to its inability to obtain the type of scrap needed to support maximum output of its furnaces.

At Columbus, Ohio, a government sponsored meeting finally got around to debating means of accelerating the scrapping of automobiles, a move recommended some time ago by the trade.

The price situation, meanwhile, continues beclouded with practically every producing area reporting that desperate mill buyers are being forced to exceed the ceilings in order to keep open hearths operating. In the East, the price situation is still far from settled, despite claims made following Washington meetings that everything was again normal.

Industry is still looking to Washington, which has assumed complete control over the scrap situation, for quick action to stave off curtailment of steel output. Steps expected to be taken include adjustment of regulations covering use of remote scrap, more orderly planning of exports, a national salvage campaign, and more efficient use of scrap trade facilities for movement of supplies.

Another phase of the scrap problem calling for immediate attention is the lack of order in exports to Canada. Canadian purchases are not centralized as are British purchases, and United States mills, especially those in the Buffalo area, complain that Canadian mills are drawing unnecessarily heavy supplies from New York and New England areas. Assertions are made that Canadian mills are able to pay above the OPACS ceiling for this material, despite warnings of the Canadian government against such practices, but no confirmation of this is available. However, it is authoritatively stated in scrap trade circles that the generous overgrading permitted on Canadian business makes it profitable and technically represents exceeding OPACS levels. It has been pointed out here that the growth of exports to Canada from New York was an important factor in the recent widespread competition in that area which resulted in prices going above the official maximum.

Data on the volume of Canadian exports are not available due to war-time secrecy, but Buffalo reports that one dock alone is handling 10,000 tons a month. Other estimates put the total movement at about more than 5000 tons monthly. Barges are moving to Buffalo ports from New York, Brooklyn, New Haven and Utica carrying No. 1 and No. 1 steel and new and old bundles. Chief destination of this material is Hamilton, Ontario.

The lack of organized control over Canada's scrap purchases in this country at a time when various domestic mills are on the verge of curtailing operations is currently being studied by several British, American and Canadian groups. It is expected that such purchasing will soon be brought under strict control in the near future, to eliminate the friction existing at present.

Steel Scrap "Mining" Reported in Chicago

Chicago

• • • Steel scrap "mining" is the latest development here in efforts of the scrap trade to meet the record breaking demand. A local scrap broker reports that he was approached by an individual who said he knew where 2000 tons of sheets had been buried in a dump for more than 10 years. He proposed to rent a steam shovel and dig up the scrap, wash it and perform such other operations as was necessary to make the material usable as scrap.

The "miner" had samples to show the broker, who declares that the scrap was in a condition that he normally would not even consider. But knowing how hungry steel mills were for scrap, the broker finally agreed to take what could be salvaged from the "mine."

American Rolling Mill and Wheeling Steel organize community drives for scrap steel. OPM, OPACS and automobile wreckers study means of stimulating car scrapping—see page 89.

Pittsburgh

The steel scrap supply here and at nearby consuming areas continues to foreshadow curtailments in steel output. Some mills are just getting by, from week to week, on the basis of new receipts and further nibbling at inventories which, in some instances, are not far short of complete depletion. A few notable exceptions to this predicament exist, however, with one mill comfortably fixed for at least three months.

Cleveland

Operators of a few foundries definitely have suffered for short intervals in this vicinity recently, due to scrap shortages. Railroads are patching old cars and using them for coal storage now. Rails are being saved for possible emergency use. Meanwhile, incoming scrap shipments at big steel plants here have been averaging at the best only 65 per cent of actual consumption recently.

Buffalo

Four scrap boats arrived this week, two from Detroit and two from Duluth, bringing 15,000 tons to local steel plants for their winter reserve stock. Of the 15,000 tons, 10,000 came from Duluth and 5000 from Detroit.

Philadelphia

With more of eastern mills reaching the point of day-to-day scrap supply, curtailment of ingot output is expected momentarily. One mill has repeatedly sought OPM aid in obtaining necessary scrap, but to no avail, and two consumers are on the verge of curtailing production this week unless scrap is forthcoming. Direct buying, as well as overgrading, is prevalent in the district, adding to the confusion.

Maximum Iron and Steel Scrap Prices

As Revised by OPACS to June 25, 1941

SCHEDULE A

Iron and Steel Scrap, other than Railroad Scrap

(Basing point prices from which shipping point prices and consumers' delivered prices are to be computed—Dollars per gross ton)

Basing Points → / GRADES ↓	Pittsburgh Johnstown, Pa. Weirton, W. Va. Steubenville, O. Youngstown Warren, O. Sharon, Pa. Canton, O.	Chicago	Kokomo, Ind.	Bethlehem, Pa. Claymont, Del. Coatesville, Pa. Phoenixville, Pa. Harrisburg	Sparrows Point, Md.	Buffalo	Cleveland	Toledo, Ohio	Portsmouth, Ohio Middletown, Ohio Ashland, Ky.	St. Louis	Detroit	Duluth	Birmingham, Ala.	Chattanooga, Tenn.	Radford, Va.	Worcester, Mass. Bridgeport, Conn. Phillipsdale, R. I.	Los Angeles San Francisco Seattle	Minnequa, Colo.
No. 1 heavy melting	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	14.50	16.50
No. 1 hydraulic compressed black sheet	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	14.50	16.50
No. 2 heavy melting	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	13.50	15.50
Dealers' No. 1 bundles	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	13.50	15.50
Dealers' No. 2 bundles	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	.....	12.50	14.50
Mixed borings and turnings	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	.....	14.75	12.75	13.10	.....	12.25	.....	.....	.....	9.75	11.75
Machine shop turnings	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	15.50	15.00	Alloy, W. Va. 17.60		(See footnotes)	10.00	12.00
Shoveling turnings	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	.....	16.00	14.00	14.35	16.50	.....	.....	.....		11.00	13.00
No. 1 busheling	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.50	.....	.....		14.00	16.00
No. 2 busheling	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	.....		10.00	12.00
Cast iron borings	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	.....	[6]15.00	13.25	13.60	13.75	12.75	.....	.....		10.25	12.25
Uncut structural and plate scrap	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	18.50	16.85	17.00	16.00	.....	.....	.....	13.50	15.50
No. 1 cupola	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	18.00	20.00	20.50	21.00	22.00	18.00	.....
Heavy breakable cast	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.85	16.50	18.50	.....	.....	20.50	17.00	.....
Stove plate	[5]19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	.....	17.00	17.50	18.00	14.00	14.00	11.25
Low phos. billet and bloom crops	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	.....	.....	.....
Low phos. bar crops and smaller	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....
Low phos. punchings and plate scrap [1]	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....
Machinery cast, cupola size [2]	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	.....	22.00	21.00	21.35	19.00	21.00	21.50	22.00	23.00	19.00	.....
No. 1 mach. cast, drop-broken, 150 lbs. and under	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	19.50	21.50	22.00	22.50	23.50	19.50	.....
Clean auto cast	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	19.50	21.50	22.00	22.50	23.50	19.50	.....
Punchings and plate scrap [3]	22.00	20.75	20.75	20.25	20.75	20.75	21.25	21.50	.....	20.50	19.50	19.85	20.00	19.00	.....	.....	.....	.....	.....
Punchings and plate scrap [4]	21.00	19.75	19.75	19.25	19.75	19.75	20.25	20.50	.....	19.50	18.50	18.85	19.00	18.00	.....	.....	.....	.....	.....
Heavy axle and forge turnings	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	.....	18.00	17.00	17.35	17.50	16.50	.....	.....	.....	14.00	.....
Medium heavy electric furnace turnings	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	.....	16.50	15.50	15.85	16.00	15.00	.....	.....	.....	12.50	.....

[1] This grade is ⅜-in. and heavier, cut 12 in. and under.
[2] May include clean agricultural cast.
[3] Under ⅜ to ¼-in., cut 12 in. and under.
[4] Under ¼-in. to No. 12 gage, cut 12 in. and under.
[5] Youngstown, Warren, Sharon and Canton are not basing points on this grade.
[6] Portsmouth, Ohio, price for this grade is $15.25. Ashland, Ky., is not a basing point for this item.

SCHEDULE B

Railroad Scrap

(Delivered Consumers' Plants Located on Line of Railroad Originating Scrap—Per Gross Ton)

Basing Points → / GRADES ↓	Pittsburgh Sharon, Pa. Wheeling, W. Va. Steubenville, O. Youngstown Canton, O.	Chicago	Kokomo, Ind.	Philadelphia	Wilmington, Del.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O. Middletown, O. Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala.	Los Angeles San Francisco Seattle	Minnequa, Colo.
No. 1 heavy melting	$21.00	$19.75	$19.25	$19.75	$19.75	$19.75	$20.50	$20.25	$20.50	$18.50	$17.00	$18.85	$19.00	$18.00	$15.50	$17.50
Scrap rails	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	19.50	18.00	19.85	20.00	19.00	16.50	18.50
Rerolling rails*	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	21.35	21.50	20.50	18.00	20.00
Scrap rails 3 ft. and under	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	21.85	22.00	21.00	18.50	20.50
Scrap rails 2 ft. and under	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	22.10	22.25	21.25	18.75	20.75
Scrap rails 18 in. and under	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	22.35	22.50	21.50	19.00	21.00

* Relaying quality $5 higher.

Where the railroad originator of the scrap operates in two or more of the basing points named in Schedule B, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that Chicago consumers of scrap originating from railroads operating in Chicago are permitted to pay as much as 84c. a gross ton in switching charges above the maxima.

Explanatory Notes

(A basing point includes its switching district.)

MAXIMUM PRICE at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than $1 prices in Schedule A for the basing point nearest the consumer.

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which scrap is to be shipped to consumer and is calculated by subtracting the lowest established charge for transporting scrap from the shipping point to the nearest basing point. The following are exceptions: The shipping point price at any shipping point in New England, of those grades for which no prices are listed at the basing points established for New England, shall be the Johnstown basing point price, minus all-rail transportation costs from the New England shipping point to Johnstown. However, the shipping point price at any shipping point in New England of those grades of scrap for which prices are listed at the basing points in New England shall be computed from those New England basing point prices.

REMOTE SCRAP: Material located beyond the zone from which the railroad freight rate to Pittsburgh is $11.20 is called remote scrap. Consumers desiring to purchase such scrap, but unable to do so without exceeding the ceiling prices, may make application to OPACS for permission to absorb the excess freight charges.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is $2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than $2.50 in transportation charges. Lowest established transportation charges will govern.

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings decline to 14,200 tons from 39,950 tons last week; new projects drop to 15,700 tons; plate awards call for 1250 tons.

AWARDS

NORTH ATLANTIC STATES

6000 Tons, Philadelphia, Southwark station for Philadelphia Electric Co., to American Bridge Co., Pittsburgh.

1560 Tons, Brooklyn, terminal market, to Harris Structural Steel Co., Plainfield, N. J.

310 Tons, Bayonne, N. J., fire station garage, to Harris Structural Steel Co., Plainfield, N. J.

200 Tons, Newark, N. J., addition to office building for American Can Co., to Dreier Structural Steel Co., New York.

135 Tons, Philadelphia, John B. Stetson Co., factory addition, to Bethlehem Steel Co., Bethlehem, Pa.

125 Tons, Buffalo, pattern shop for Worthington Pump & Machinery Corp., to Austin Co., Cleveland.

THE SOUTH

106 Tons, Talladega, Ala., five bag-loading buildings for War Department, to Ingalls Iron Works Co., Birmingham.

CENTRAL STATES

1600 Tons, St. Louis, Emerson Electric Co. building, to Mississippi Valley Structural Steel Co., St. Louis.

550 Tons, Seattle, Wash., camouflage plant, Boeing Aircraft Co., to Wisconsin Bridge & Iron Co., Milwaukee.

265 Tons, Kingman County, Kan., State highway bridge, to George C. Christopher & Son, Wichita, Kan.

WESTERN STATES

1600 Tons, Oakland, Cal., Navy supply depot, to Judson-Pacific Co., San Francisco, through Clinton Construction Co., San Francisco, Cal., contractor.

900 Tons, Friant, Cal., drum gates for Friant Dam (Specification 963), to American Bridge Co., Pittsburgh.

280 Tons, Sacramento, Cal., Army air corps hangar, to Herrick Iron Works, Oakland, Cal.

180 Tons, Seattle, Army port of embarkation warehouse, to Wisconsin Bridge & Iron Co., Milwaukee, through Western Construction Co., Seattle, contractor.

100 Tons, Oakland, Cal., International Harvester Co. branch, to Independent Iron Works, Oakland, through K. E. Parker Co., San Francisco, contractor.

PHILIPPINE ISLANDS

248 Tons, three Navy storehouses, to Ingalls Iron Works Co., Pittsburgh plant.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

4500 Tons, Rome, N. Y., Army airplane repair building.

1800 Tons, Presque Isle and Houlton, Me., temporary air corps hangars for U. S. Engineers.

885 Tons, Niagara Falls, N. Y., four buildings for National Carbon Co.

1000 Tons, Tonawanda Township, N. Y., airplane motors testing building for Chevrolet-Buffalo division, General Motors Corp.

600 Tons, Brooklyn, manufacturing and storage building for Todd Shipyards Corp.

400 Tons, Niagara Falls, Ont., addition for Carborundum Co., Ltd.

220 Tons, New York, freight house, Marginal Street.

200 Tons, Worcester, Mass., addition for Heald Machine Co.

THE SOUTH

510 Tons, Clarksburg, W. Va., furnace building for National Carbon Co.

450 Tons, Norfolk, Va., staging for Navy Yard shipways.

300 Tons, Parkin, Ark., bridge No. 100 for Missouri Pacific Railroad.

130 Tons, Bullitt-Jefferson Counties, Ky., Pond Creek State bridge.

CENTRAL STATES

550 Tons, Lone Rock, Wis., State bridge No. 81, Wisconsin River.

530 Tons, Sauk Rapids-St. Cloud, Minn., State bridge No. 5947.

420 Tons, Medora, N. D., State bridge FAP-307-B, Little Missouri River.

350 Tons, Bay City, Mich., manufacturing building for General Motors Corp., Chevrolet Motor division.

240 Tons, Oak Forest, Ill., State bridge, route 53, section 537-SF.

175 Tons, Spring Valley, Wis., State bridge No. 775, Eau Galle River.

165 Tons, Ohio River dams, edge armor, for U. S. Engineers Office.

140 Tons, Peoria, Ill., building for Caterpillar Tractor Co.

115 Tons, Mulberry Grove, Ill., State bridge, route FA-12, section 6-2-BF.

Unstated tonnage, Lacarne, Ohio, additional government warehouses.

Unstated tonnage, Toledo, bearing piles for Libby-Owens-Ford Glass Co.

WESTERN STATES

8500 Tons, Sunnyvale, Cal., wind tunnel at Moffett Field; rebid Aug. 1.

2000 Tons, Alameda, Cal., Naval air base hangars; Johnson, Drake, & Piper, Oakland, Cal., contractors.

FABRICATED PLATES

AWARDS

750 Tons, Kremmling, Colo., penstocks and outlet pipes for Green Mountain Dam (Specification 964), to S. Morgan Smith Co., York, Pa.

250 Tons, Mesa, Ariz., elevated water tank, Invitation 280, to Darby Products Steel Plate Corp., Kansas City, Kan.

250 Tons, Victorville, Cal., elevated water tank, Invitation 280, to Chicago Bridge & Iron Co., Chicago.

PENDING PROJECTS

2500 Tons, Sunnyvale, Cal., wind tunnel at Moffett Field; rebid Aug. 1.

SHEET PILINGS

AWARDS

1600 Tons, also 300 tons H-piling, San Francisco, quay wall at Naval dry docks, Hunters Point (Specification 10,376), divided equally between Bethlehem Steel Co. and Columbia Steel Co., San Francisco, by Healy Tibbitts Construction Co., San Francisco, contractor.

637 Tons, Mare Island, Cal., piling for Navy Yard, to Heafey-Moore Co., and Fredcrickson & Watson Construction Co.

100 Tons, Cleveland, bulkhead for Erie Railroad, to Carnegie-Illinois Steel Corp., Pittsburgh.

PENDING PROJECTS

400 Tons, Mare Island, Cal., Navy Yard waterfront facilities; Cahill Brothers and Ben C. Gerwick, San Francisco, joint contractors.

300 Tons, Detroit, requirements of U. S. Engineers.

Reinforcing Steel

Awards of 22,500 tons; 11,100 tons in new projects.

AWARDS

ATLANTIC STATES

700 Tons, Buffalo, grain elevators, Standard Milling Co., divided among Republic Steel Corp., Cleveland; Bethlehem Steel Co., Bethlehem, Pa., and Jones & Laughlin Steel Corp., Pittsburgh.

300 Tons, Bethlehem, Pa., Coca-Cola bottling plant, to Bethlehem Steel Co., Bethlehem, Pa.; Ralph S. Herzog, contractor.

285 Tons, Boston, Navy Yard requirements, to Youngstown Sheet & Tube Co., Youngstown, through Stone & Webster Engineering Co., Boston.

200 Tons, New York, J. Fenimore Cooper High School, to Jones & Laughlin Steel Corp., Pittsburgh, through Fireproof Products Co.

155 Tons, Philadelphia, laboratory building for Quartermaster's Depot, to Truscon Steel Co., Youngstown, through Wark & Co.

100 Tons, Paterson, N. J., Delaware, Lackawanna & Western grade elimination, to Bethlehem Steel Co., Bethlehem, Pa.; Franklin Construction Co., contractor.

100 Tons, Baltimore, Coast Guard facilities, to Bethlehem Steel Co., Bethlehem, Pa.; T. G. Egan Engineering Co.

Weekly Bookings of Construction Steel

Week Ended →	July 29, 1941	July 22, 1941	July 1, 1941	July 30, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	14,200	39,950	34,000	49,100	884,210	523,980
Fabricated plate awards	1,250	4,400	4,520	1,210	93,665	83,685
Steel sheet piling awards	2,340	345	990	1,630	20,630	27,555
Reinforcing bar awards	22,500	5,650	10,425	15,400	372,755	261,185
Total Letting of Construction Steel	40,290	50,345	49,935	67,340	1,371,260	896,405

SOUTH AND CENTRAL

2860 Tons, Huntington, W. Va., U. S. Engineer, Guyandotte flood wall, to West Virginia Rail Co., Huntington, W. Va.; Midwest Construction & Asphalt Co., contractor.

1500 Tons, Kingsbury, Ind., addition to ammunition loading plant, divided between Joseph T. Ryerson & Son, Inc., Chicago, and Bethlehem Steel Co., Bethlehem, Pa.

1230 Tons, Milan, Tenn., ammunition depot, to Truscon Steel Co., Youngstown, through Ferguson-Oman Co.

1200 Tons, Norfolk, Va., Yorktown Mine Depot requirements, to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Steel Co., Virginia Engineering Co. and Wise Construction Co.

622 Tons, Childersburg, Ala., plant for E. I. du Pont de Nemours & Co., to Truscon Steel Co., Youngstown, Ohio.

450 Tons, Cleveland, plant for Chase Brass & Copper Co., to Republic Structural Iron Works, Cleveland, through Stone & Webster Engineering Co.

329 Tons, Port Huron, Mich., Marysville plant for Detroit-Edison Co., to Truscon Steel Co., Youngstown.

150 Tons, Beckley, W. Va., Rawleigh Coca-Cola plant, to West Virginia Rail Co., Huntington, W. Va.; J. O. Freeman, contractor.

120 Tons, Des Moines, Iowa, Burlington Railroad overpass, to Sheffield Steel Corp., Kansas City, Mo.

117 Tons, Connersville, Ind., WPO project, to Truscon Steel Co., Youngstown.

WESTERN STATES

6300 Tons, Pacific Ocean Islands, Navy facilities, to Sheffield Steel Corp., Kansas City, Mo., through Hawaiian-Raymond-Turner and Associates, contractors, Alameda, Cal.

2200 Tons, Seattle, Army port of embarkation warehouse, to Bethlehem Steel Co., Seattle, through Western Construction Co., Seattle, contractor.

1072 Tons, North Sacramento, Cal., highway viaduct, to Herrick Iron Works, Oakland, Cal., through Earl W. Heple, San Jose, Cal., contractor.

440 Tons, Friant, Cal., Friant Dam (Invitation 48,826-A-1), to Bethlehem Steel Co., San Francisco.

300 Tons, San Francisco, United States Engineer, South Pacific Division, Invitation 868-42-1, to Bethlehem Steel Co., San Francisco.

150 Tons, Earp, Cal., Parker power plant (Invitation A-44,345-A-1), to Bethlehem Steel Co., San Francisco.

106 Tons, Granger, Wash., Yakima project (Invitation B-33,507-A), to Bethlehem Steel Co., San Francisco.

PANAMA CANAL

500 Tons, schedule No. 5279, to Youngstown Sheet & Tube Co., Youngstown.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

400 Tons, Erie, Pa., General Electric Co. turbine manufacturing plant; United Engineering & Construction Co.

400 Tons, Baltimore, Maryland Drydock Co. expansion.

300 Tons, Bristol, Pa., Fleetwings, Inc., aircraft plant.

SOUTH AND CENTRAL

1700 Tons, Jeffersonville, Ind., floor control; Robert Anderson Co., Chicago, low bidder on general contract.

1200 Tons, Marche, Ark., Army picric acid plant; Lummus Co., contractor.

300 Tons, Wright Field, Ohio, Army warehouses; F. Messner & Sons.

300 Tons, Patterson Field, Ohio, Army Air Corps, two storage buildings; J. I. Barnes.

300 Tons, Ypsilanti, Mich., sewage disposal plant, Ford Motor Co.; Couse & Saunders.

240 Tons, Wright Field, Ohio, engine test torque stand; Simpson Construction Co.

220 Tons, Portsmouth, Va., Navy Yard requirements 86 (42)-NSAF.

200 Tons, Dearborn, Mich., Ford Motor Co. power plant; Bryant & Detwiler.

200 Tons, Des Moines, Broadlawn Hospital.

158 Tons, Hemingford and Hay Springs, Neb., Bureau of Reclamation Invitation 34,156-A-1; bids in.

100 Tons, Cleveland, airport building.

100 Tons, Akron, Firestone Tire & Rubber Co. requirements.

Unstated tonnage, Lacarne, Ohio, additional government warehouses.

WESTERN STATES

6000 Tons, San Francisco, Metropolitan Life Insurance Co. housing project.

450 Tons, Sunnyvale, Cal., wind tunnel at Moffett Field; rebid Aug. 1.

169 Tons, Mecca, Cal., All-American Canal (Invitation C-42,210-A); bids July 31.

165 Tons, Mancas, Colo., Bureau of Reclamation Invitation 17,007-A-2; bids in.

151 Tons, Earp, Cal., Parker power plant (Invitation A-44,383-A); bids in.

150 Tons, Coram, Cal., Shasta Dam (Invitation A-33,277-A-1); bids in.

Pipe Lines

● **Sinclair Refining Co.,** 840 South Lamar Street, Dallas, Tex., has authorized new 4-in. steel pipe line in Muenster, Tex., oil field, Cooke County, to connection with main pipe line system, about nine miles, for crude oil transmission. Work will be carried out by Sinclair Pipe Line Co., an affiliated interest.

West Virginia Gas Corp., Union Trust Building, Charleston, W. Va., plans two 6-in. welded steel pipe lines across bed of Big Kanawha River, near Plymouth, W. Va., connecting with pipe line system, for natural gas transmission.

United States Engineer Office, Customhouse, Philadelphia, asks bids until Aug. 5 for 22 lengths of 20¼-in. steel pontoon pipe, each length 40 ft. (Circular 30).

Plantation Pipe Line Co., Inc., Baton Rouge, La., and Atlanta, Ga., care of Standard Oil Co. of Kentucky, Inc., 426 West Bloom Street, Louisville, has awarded contracts for new 12-in. welded steel pipe line from Baton Rouge and vicinity to Greensboro, N. C., about 1250 miles, for gasoline transmission, as follows: Section of main line extending from Baton Rouge to Mississippi-Alabama State line, to Latex Construction Co., Oil and Gas Building, Houston, Tex.; section of main line from last noted point to Alabama-Georgia State line, to Oklahoma Contracting Co., Magnolia Building, Dallas, Tex.; another section of main line from Alabama State line to Greensboro, line terminus, including lateral lines from Bremen, Ga., where line built by Oklahoma company will terminate, to Chattanooga and Knoxville, Tenn., to Williams Brothers Corp., National Bank of Tulsa Building, Tulsa, Okla. An award for lateral lines to be built to Birmingham and Montgomery, Ala., and to Columbus and Macon, Ga., will be made soon. Bulk terminals, with storage and distribution facilities, will be built at Charlotte, Salisbury and Greensboro, N. C., and at Belton and Spartanburg, S. C. Entire project will cost over $15,000,000 including booster pumping stations and other operating facilities. Ford, Bacon & Davis, Inc., 39 Broadway, New York, is engineer and general contractor for system. Plantation company will establish main offices at Atlanta, Ga. It was organized recently as a joint subsidiary of Standard Oil Co. of Kentucky; Standard Oil Co. of New Jersey, Inc., 26 Broadway; and Shell Union Oil Corp., 50 West Fiftieth Street, both New York.

Hope Natural Gas Co., Union Trust Building, Charleston, W. Va., plans new 20-in. welded steel pipe line from Monroe, La., gas field to connection with main pipe line system in West Virginia, about 825 miles, for natural gas transmission, supplementing present sources of supply in last noted area for increased service to points in Ohio and western Pennsylvania. Cost over $20,000,000 with booster stations and other operating facilities. Company is affiliated with Standard Oil Co. of New Jersey, Inc., 26 Broadway, New York.

Phillips Petroleum Co., Bartlesville, Okla., plans new 6-in. welded steel pipe line near McPherson, Kan., about six miles, for crude oil transmission, replacing a present section of main pipe line in that area.

United States Indian Irrigation Service, Los Angeles, asks bids Aug. 1 on 1140 ft. of 24-in. by ⅜-in. enameled siphon pipe; butterfly control valve, and fittings, f.o.b. Ignacio, Colo.

Bureau of Reclamation, Denver, has awarded 30,000 ft. of 18-in. outside diameter, 12 gage steel pipe for Granby, Colo. (Invitation C-46,051-A), and steel ventilating pipe for same point (Invitation C-46,052-A), to Naylor Pipe Co., Chicago.

United States Engineer, South Pacific division, has received bids on 6400 ft. of ¼-in. dredge shore pipe and 1000 ft. of ½-in. dredge pontoon pipe.

Tacoma, Wash., has opened bids on 9461 ft. of 52-in. pipe. Steel Tank & Pipe Co., Portland, Ore., is low bidder, with steel pipe alternate.

Cast Iron Pipe

● **Board of Trustees,** Sanitary District No. 1, Lancaster County, near Lincoln, Neb., Ralph S. Moseley, secretary, asks bids until Aug. 6 for about six tons of 3 to 8-in. cast iron pipe and fittings for water system.

Sanitary District, Warrens, Wis., plans pipe lines for water system and other waterworks installation. Cost about $38,000. Financing will be arranged through Federal aid. General Engineering Co., Portage, Wis., is consulting engineer.

United States Engineer Office., Mobile, Ala., asks bids until Aug. 9 for water distribution system, comprising about 47,000 ft. of cast iron pipe, various sizes, 10,000 ft. for service connections, fire hydrants, valve boxes, etc.; about 33,000 ft. of cast iron pressure pipe for gas distribution system, with 120 1-in. regulators and cut-offs; 2650 ft. of cast iron forged main, with bends, fittings, etc., for pumping station connections (Circular 37).

Goose Creek, Tex., plans pipe lines for water system and other waterworks installation. Fund of about $143,000 is being arranged through Federal aid for this and extensions and improvements in sewer system.

Water Department, Rock Island, Ill., plans pipe line extensions in water system near Thirty-eighth Street; also new steel standpipe in same district. Cost close to $100,000.

Kelso, Wash., plans pipe line extensions and improvements in water system, and other waterworks installation. Cost about $125,000. J. L. Henderson and R. G. Anderson, Vancouver, Wash., are consulting engineers.

Ogden, Utah, is arranging special election to approve bond issue for about $2,500,000 for extensions in pipe lines for water system in various parts of city, including main lines to new Federal ordnance depot near city. E. T. Saunders is city water commissioner.

Burbank, Cal., will take bids August 5 on 15,000 ft. of 6-in. pipe, class 250.

East Bay Municipal Utility District, Oakland, Cal., will receive bids Aug. 6 on 100,000 ft. of 4-in. pipe, 150,000 ft. of 6-in. and 50,000 ft. of 8-in. (Specification 275).

United States Treasury Department Procurement Office, San Francisco, has awarded 10,500 ft. of cast iron pipe to United States Pipe & Foundry Co., San Francisco, on a bid of $2.295 per lin. ft.

Alloy Steel Supply for Aircraft Use to Be Tripled

Washington

● ● ● **The OPM on Monday** announced that steps are being taken to triple the supply of fabricated alloy steel for aircraft manufacturers before the end of 1942. The OPM iron and steel branch said that the increased supply of alloy steel is to be obtained not only by expanding the industry's electric furnace, heat treating and other finishing capacity but by allocation of orders so as to obtain maximum output from present facilities.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extas, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, MFG. Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES											(Coatesville and Claymont = 2.10¢)				
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ (11)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only. 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pitsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and smaller by 6 in. and shorter	65½
9/16 and ⅝ in. by 6 in. and shorter	63½
¾ to 1 in. by 6 in. and shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65
Nuts, cold punched or hot pressed, hex. or square:	
½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pitsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Per Cent Off List*
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap screws, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 23	July 24	July 25	July 26	July 28	July 29
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York[2]	53.50	54.00	55.00	....	54.50	54.50
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis[3]	5.70	5.70	5.70	5.70	5.70	5.70

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits, pig	56.00	55.00
Copper		
Electro	13.00	13.25
Castings	12.50	13.15
H. R. Sheets*	20.87	20.87
Seamless tubes*	21.37	21.37
Brass		
Yellow sheets*	19.48	19.48
Yellow, rods*	15.01	15.01
Seamless tubes*	22.23	22.23
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	Nom'al	Nom'al
Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	91.0
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt. 98-99%	18.00	18.50
Solder		
½ and ½	33.25	32.75
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	11.25	11.875
Hvy. and wire	10.25	10.75
Light and bottoms	9.00	9.50
Brass		
Heavy	6.75	7.25
Light	5.25	6.00
No. 1 yel. turn	6.25	6.75
No. 1 red or compo. turnings	9.75	10.75
Hvy. Mach. compo.	10.00	10.25
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	11.00	12.00
Sheet	12.00	13.50
Zinc	....	5.10

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $190, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade .....2.70c.
Delivered, Detroit .....2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
C-V	0.85
6100 Cr-V spring steel	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.

Open hearth grade .. ..3.50c.

Andrews Quality

PROVED AT ALL THREE CRITICAL POINTS

IN THE STEEL PLANT

IN YOUR PRODUCTION

IN PRODUCT PERFORMANCE

ANDREWS STEEL

It is not enough to prove the quality of the bar, billet or slab at the Andrews plant in the laboratory. That is but the initial test. The second is equally important—how Andrews steel acts under your production processes and methods, and how well it fits into the requirements of your product. The third, performance, is the vital trial ground. This is the most critical and exacting of all, where your product must demonstrate its ability to give trouble-free, dependable, day-in and day-out service.

Andrews steel is manufactured with this third great test in mind. That is why so many Andrews customers find it to their advantage to standardize on Andrews steel—and enjoy the benefits of triple-proved quality at all three critical points—in the steel plant—in your production—in the hands of the consumer.

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

ANDREWS PRODUCTS IN CARBON AND ALLOY STEEL: Bars • Plates • Universal Mill Plates • Sheet Bars • Billets • Blooms • Slabs

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago..$54.80
6-in. and larger, del'd New York 52.20
6-in. and larger, Birmingham.. 46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle 56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37,35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over ..... Base
30,000 lb. or ft. to 39,999 lb. or ft. 5%
20,000 lb. or ft. to 29,999 lb. or ft. 10%
10,000 lb. or ft. to 19,999 lb. or ft. 20%
5,000 lb. or ft. to 9,999 lb. or ft. 30%
2,000 lb. or ft. to 4,999 lb. or ft. 45%
Under 2,000 lb. or ft..... 65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = $200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	33
¼ to ⅜ in.	59	40½
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+33
½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Lap Weld

Steel		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
7 and 8 in.	65	52½
9 and 10 in.	64½	52
11 and 12 in.....	63½	51
Wrought Iron		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
9 to 12 in.	38½	12

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	38½
¼ to ⅜ in.	56½	42½
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron		
¼ and ⅜ in. .....+10		+46
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
7 and 8 in.	65½	53
9 and 10 in.	64½	52
11 and 12 in.	63½	51
Wrought Iron		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21
7 and 8 in.	38½	21½
9 to 12 in.	32	17½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher. on all butt weld 8 in. and smaller.

Speed Your Defense Orders with this "team that's hard to beat"... Macwhyte PREformed Crane Rope and Macwhyte Atlas Slings

CRANE ROPE

EXTRA TOUGH is this Macwhyte PREformed Crane Rope because outer wires (a) in every strand are specially drawn for outside service. These wires are a Macwhyte Crane Rope's "first line of defense"... that's why we give them a TOUGH abrasion-resisting skin.

IT'S EXTRA FLEXIBLE, too, because the inner wires (b) in each strand of a Macwhyte PREformed Crane Rope are drawn in a special way to make them extra strong, extra pliable. These inner wires are the reserve strength of the rope.

YOU'LL FIND Macwhyte PREformed Crane Ropes available from stock in the CORRECT size, grade, and construction you need.

Use the CORRECT ropes for your equipment

MACWHYTE
PREformed
CRANE ROPES

SLINGS

No other sling gives you all the advantages of a Macwhyte Altas Sling. Why? Because no other sling is made from left-lay AND right-lay endless wire ropes...specially braided in a uniform, balanced, spiral construction.

Thanks to this special construction of left-AND-right lay ropes you get all these advantages:

(1) A Macwhyte Atlas Sling is positively non-spinning;
(2) It is extremely flexible, kink-resistant, light-weight, easy to handle;
(3) It is one of the world's SAFEST lifting elements; and
(4) Its service life is extra long because the left-lay and right-lay ropes work together, do not fight and grind each other under load.

Men on the job like the way these slings handle... you'll like the way they help reduce handling time and costs. Send for Sling Catalog S-6. Please write on company letterhead stating title.

NO. 568

Assure SPEED Plus SAFETY With

MACWHYTE
Atlas Braided Wire Rope
SLINGS

MACWHYTE COMPANY • 2911 Fourteenth Ave. • Kenosha, Wis.

Manufacturers of wire rope to meet every need — left- & right lay braided slings — Stainless Steel wire rope — Aircraft cable, Aircraft tie rods, and "Safe-Lock" Swaged Terminals.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Grosss Ton

Old range, bessemer, 51.5%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

African, Indian, 44 to 48% Mn. 61c. to 65c.

African, Indian, 49 to 51% Mn. 71c. to 72c.

Brazilian, 46 to 48% Mn..69c to 70c.

Cuban, del'd, duty free, 51% Mn. .....

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$24 to $25

Tungsten, domestic, scheelite, delivered .....$24 to $25

Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton; South Cuban, 32% $18.00

Indian, 48-50% .....$38 to $40

Rhodesian, 48% .....$35 to $40

VIRGIN ALUMINUM: Here are workmen watching the start of the flow of virgin aluminum at the new Reynolds Metals Co. plant at Listerhill, Ala., in the Muscle Shoals district. The first aluminum in this plant was produced in less than six months from the start of construction. The second Reynolds plant at Longview, Wash., is expected to be in production soon. Together the plants will produce more than 100,000,000 lb. of aluminum each year. (July production from the Listerhill plant is estimated at 1,700,000 lb.)

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton.....	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads...	4.75c.
Track bolts, discount to jobbers all sizes (per 100 counts)....	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....	$21.00
Domestic, f.o.b. Ohio River landing barges	21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines.....	21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid.....	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick *Per 1000 f.o.b. Works*

Super-duty brick at St. Louis..	$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey.....	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri, and Illinois	46.55
Second quality, New Jersey....	51.00
No. 1 Ohio.....	43.00
Ground fire clay, per ton.....	7.60

Silica Brick

Pennsylvania	$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick *Net per Ton*

Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	$54.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks.....	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00
Domestic, 78-82%, carlots, f.o.b. Tennessee furnaces 145.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload, lots, bulk)....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, Silicon 6.00 to 6.50%

Jackson, Ohio $29.50*
Buffalo, N. Y. 30.75*

For each additional 0.25% silicon up to 10%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Manganese, each 0.50% over 1%, 50c. a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

*Official maximum prices established by OPACS on June 25.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C. f.o.b. furnace carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C. f.o.b. furnace, carload and contract per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24% per gross ton, $3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo., f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.
Molybdenum oxide, in cans, per lb. of contained Mo, f.o.b. Washington, Pa. ..... 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.90c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..6.25c.
No. 4 indus., del'd Cleveland....5.75c.
No. 5 indus., del'd Cleveland...5.375c.
No. 6 indus., del'd Cleveland...5.00c.

PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center, and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH
PRESSED STEEL CO.
READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California

PARISH
Specialists in
STAMPINGS
of Distinction

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$6.00 to $6.25

Foundry, f.o.b. Connellsville, prompt .....$6.75 to $7.00

F'dry, by-product, Chicago..... 10.50

F'dry, by-Product, New England 13.75

Foundry, by-product, Newark or Jersey City .....$12.45 to 12.95

F'dry, by-product, Philadelphia. 12.13

F'dry, by-product, Cleveland... 12.30

F'dry, by-product, Cincinnati... 11.75

Foundry, Birmingham 8.50

F'dry, by-product, St. Louis $10.75 to $11.00

BRITISH

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export £29 16s. 3d.

Tin plate, per base box. 32s. to 33s.

Steel bars, open hearth..£16 10s.

Beams, open hearth....£19 10s.

Channels, open hearth...£19 10s.

Angles, open hearth....£15 10s.

Black sheets, No. 24, gage £22 5s. max.* £22 5s. min.**

Galvanized sheets, No. 24 gage £25 12s. 6d max.*; £25 12s. 6d. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

All prices set **in bold face type** are maxima established by OPACS on June 24. Other domestic prices are delivered quotations computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	$25.50	$25.00	$26.50	$26.00	.....
Brooklyn	27.50	.....	.....	28.00	.....
Jersey City	26.53	26.03	27.53	27.03	.....
Philadelphia	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.	***$25.00***	***$24.50***	***$26.00***	***$25.50***	.....
Everett, Mass.	***25.00***	***24.50***	***26.00***	***25.50***	.....
Swedeland, Pa.	***25.00***	***24.50***	***26.00***	***25.50***	.....
Steelton, Pa.	.....	***24.50***	.....	.....	***29.50***
Birdsboro, Pa.	***25.00***	***24.50***	***26.00***	***25.50***	***29.50***
Sparrows Point, Md.	***25.00***	***24.50***	.....	.....	.....
Erie, Pa.	***24.00***	***23.50***	***25.00***	***24.50***	.....
Neville Island, Pa.	***24.00***	***23.50***	***24.50***	***24.00***	.....
Sharpsville, Pa.*	***24.00***	***23.50***	***24.50***	***24.00***	.....
Buffalo	***24.00***	***23.00***	***25.00***	***24.50***	***29.50***
Cincinnati	24.44	24.61	.....	25.11	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....
St. Louis	24.50	24.02	.....	.....	.....
Chicago	***24.00***	***23.50***	***24.50***	***24.00***	.....
Granite City, Ill.	***24.00***	***23.50***	***24.50***	***24.00***	.....
Cleveland	***24.00***	***23.50***	***24.50***	***24.00***	.....
Hamilton, Ohio	***24.00***	***23.50***	.....	***24.00***	.....
Toledo	***24.00***	***23.50***	***24.50***	***24.00***	.....
Youngstown*	***24.00***	***23.50***	***24.50***	***24.00***	.....
Detroit	***24.00***	***23.50***	***24.50***	***24.00***	.....
St. Paul	26.63	.....	27.13	26.63	.....
Duluth	***24.50***	.....	***25.00***	***24.50***	.....
Birmingham	***20.38***	***19.00***	***25.00***	.....	.....
Los Angeles, San Francisco and Seattle	27.50	.....	.....	.....	.....
Provo, Utah	***22.00***	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....
Toronto	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....***$23.50***

CHARCOAL

Lake Superior fce.....***$28.00***
Lyles, Tenn, high phos. fce..... ***28.50***
Lyles, Tenn., low phos. fce..... ***33.00***
Delivered Chicago..... 31.34

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.05	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.30	$3.38	$5.10
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	....	4.24	4.35	4.23	7.30
Sheets, galvanized	4.75	4.60	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	...
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	2.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.60	7.67	7.35	7.50	....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	9.35
Bars, cd. drn. SAE 2300	8.15	8.15	8.40	8.56	8.84	8.70	8.40	8.63	....	8.77	8.84	8.63	11.35
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lbs.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43. **Over 4 in. wide and over 1 in. thick, $4.95.

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The new Plant 1 (left) replaced the original building at the Norton plant in 1939.

The new Plant 3 (right) replaced the former building in 1938.

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New tunnel kilns, new facilities, larger payroll, day and night operation, have stepped up production.

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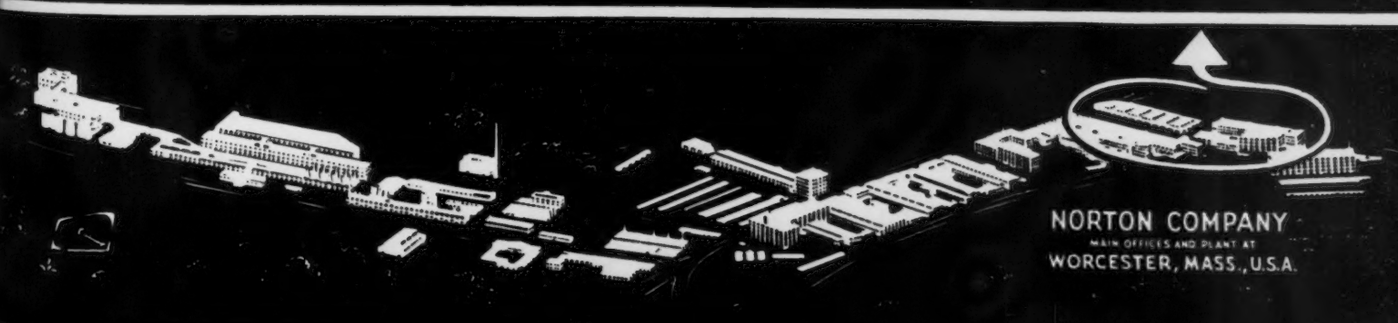

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Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **American Metal Crafts Co., Inc.,** 49 South Main Street, Attleboro, Mass., metal specialties, has let general contract to Clive Akerley, 18 Thatcher Street, for new one-story plant, 50 x 270 ft. Cost close to $70,000 with equipment.

Chromium Corp., Waterbury, Conn., has let general contract to Oscar Stroberg & Son, 1003 Watertown Avenue, for one-story addition, 50 x 180 ft., to plating works near Huntingdon Avenue. Cost close to $45,000 with equipment.

Central Maine Power Co., Augusta, Me., plans new steam-electric power plant at Wiscasset, Me., with initial capacity of 40,000-kw.; also will make extensions in transmission lines in that area. Entire project to cost over $500,000. J. H. and J. C. Stevens, 187 Middle Street, Portland, Me., are consulting engineers.

Auto-Ordnance Corp., 1437 Railroad Avenue, Bridgeport, Conn., has let general contract to Edward E. Bray Co., 362 River Street, for two-story addition, 60 x 80 ft., and alterations and improvements in present building, recently acquired for production of tools, gages, gun parts, etc. Cost close to $50,000 with equipment.

Acme Wire Co., 1255 Dixwell Avenue, New Haven, Conn., electrical wires, condensers, coils, etc., has let general contract to J. N. Leonard & Co., 902 Chapel Street, for one-story addition, 20 x 122 ft. Westcott & Mapes, Inc., 139 Orange Street, is architect and engineer.

Federated Metals Division, American Smelting & Refining Co., 120 Broadway, New York, metal products, has asked bids on general contract for one-story addition, 82 x 120 ft., to branch plant at 4041 Park Avenue, St. Louis, for storage and distribution. Cost close to $50,000 with equipment. Murphy & Wischmeyer, 911 Locust Street, St. Louis, are architects; Neal J. Campbell, last noted address, is engineer.

Babcock Machinery Co., 40-22 Twenty-third Street, Long Island City, has leased one-story building at 14-44 Fortieth Road for expansion. Main offices are at 1475 Broadway, New York.

Phelps Dodge Copper Products Corp., 40 Wall Street, New York, has arranged with Defense Plant Corp., Washington, for increase of $105,000 in initial fund of $2,995,000 for new plant and equipment at Los Angeles, for production of copper products for government.

Robins Dry Dock & Repair Co., Erie Basin, Brooklyn, has asked bids on general contract for one and three-story mill and shop addition on Beard Street, 150 x 500 ft. Cost over $450,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer. Company also has let general contract to C. J. Moore, Inc., 285 Madison Avenue, New York, for new boiler house at yard. Cost close to $150,000 with equipment.

Hewitt Rubber Corp., 240 Kensington Avenue, Buffalo, mechanical rubber goods, has approved plans for one and two-story additions, 47 x 120 ft., and 28 x 40 ft., respectively. Cost over $70,000 with equipment. H. E. Plumer & Associates, 775 Main Street, are engineers.

Uniloy Accessories Corp., 208 Erie Avenue, Lancaster, N. Y., oxygen regulators and parts, has begun work on one-story addition, about 10,000 sq. ft. of floor space, for production for British Government. Cost close to $45,000 with equipment.

Remington-Rand, Inc., 465 Washington Street, Buffalo, has authorized one-story addition to branch plant at Ilion, N. Y., for production of 40-mm. shells for government. Cost over $150,000 with equipment. This supplements another one-story addition to same plant for which superstructure recently was begun, to cost close to like amount.

Fedders Mfg. Co., 57 Tonawanda Avenue, Buffalo, automobile radiators, unit heaters, etc., will carry out expansion, including additional machinery for new division for production of machine gun links and bullet clips for government, for which company has received orders totaling about $2,000,000 and $600,000 for respective items.

Department of Public Works, City Hall, Buffalo, Louis A. Harding, commissioner, asks bids until Aug. 7 for one multi-stage, noncondensing impulse-type turbine generator, 250-kva. rating, with automatic nozzle control, oil relay governor, oil cooler, etc., for power house at J. N. Adam Hospital, Perrysburg, N. Y.

Standard Container, Inc., 266 Glenwood Avenue, Bloomfield, N. J., metal cans and containers, has purchased former plant of Liondale Bleach, Dye & Print Works, Rockaway, N. J., comprising about 25 acres, improved with several buildings totaling over 250,090 sq. ft. of floor space, and will improve for new plant, primarily for government orders. Present plant at Bloomfield will be continued.

Metal & Thermit Corp., 120 Broadway, New York, has let general contract to Andrew Christensen & Son, Inc., 80 Broad Street, Elizabeth, N. J., for new one-story technical and research laboratory at Randolph and Rahway Avenues, Woodbridge, N. J., to total about 16,000 sq. ft. of floor space. Equipment will be installed for testing and development work in thermit welding, thermit metals and alloys, arc welding electrodes, etc. Cost over $125,000 with equipment. Carl Preis, 230 Park Avenue, New York, is architect.

Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J., aircraft instruments and parts, has leased former one-story plant of United Piece Dye Works, Hawthorne, N. J., totaling 30,000 sq. ft. of floor space, and will remodel for production of alloy castings.

Heyden Chemical Corp., 290 River Road, Garfield, N. J., has let general contract to J. H. Steele & Sons, Inc., 48 North Second Street, Paterson, N. J., for three-story and basement addition, about 48 x 50 ft., in part for storage and distribution. Cost close to $50,000 with equipment. Arthur Haenicken, 349 Ninth Avenue, Paterson, is architect.

United States Engineer Office, First and Douglas Streets, N. W., Washington, plans new hangar, 120 x 200 ft., with maintenance and repair department, gasoline storage and distributing system, and other facilities at Connellsville, Pa. Cost about $250,000 with equipment. Appropriation in that amount will be arranged.

Publicker Commercial Alcohol Co., 1800 West Lehigh Avenue, Philadelphia, has let general contract to S. H. Levin, 1619 Sansom Street, for one-story addition for expansion in processing department. Cost close to $50,000 with equipment.

Erie County Electric Co., Twelfth and French Streets, Erie, Pa., plans extensions and improvements in steam-electric power station at Cranberry and West Fifth Streets, including additional equipment. Cost over $150,000 with equipment. United Engineers & Constructors, Inc., 1401 Arch Street, Philadelphia, is consulting engineer.

Linde Air Products Co., Inc., 30 East Forty-second Street, New York, has taken out permit for main one-story unit of new branch plant at Juniata, Altoona, Pa. Other structures also will be erected. Cost over $200,000 with equipment.

Stroehmann Baking Co., 353 Washington Boulevard, Williamsport, Pa., will begin work on new two-story plant, 25 x 220 ft., for which general contract recently was let to Lundy Construction Co., 1896 West Fourth Street. Cost close to $50,000 with ovens, mixers, conveyors and other equipment.

War Department, Washington, plans new storage and distributing buildings, shops and other structures at Army Proving Grounds, Erie, Pa. Cost about $425,000. Appropriation in that amount is being arranged.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 4 for two sets of watertight doors and operating mechanisms, including gear motors, reducers, bearings, limit switches, etc. (Schedule 5324); two displacement-type water meters, 2-in. (Schedule 5329).

C. M. Kemp Mfg. Co., 405 East Oliver Street, Baltimore, gas producers, gas burners, furnaces, etc., has asked bids on general contract for one-story addition. Cost over $45,000 with equipment. A. C. Radziszewski, 20 East Lexington Street, is architect.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in ship repair facilities at destroyer base, San Diego, Cal., and San Pedro operating base, Los Angeles, including new shipways, shops, and other structures. Cost about $5,000,000 with machinery. Appropriation in that amount will be arranged.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 5 for 450 aluminum-alloy marine use clothes lockers for Sewall's Point, Va., and Oakland, Cal., yards (Schedule 7971); 450,000 lb. copper-nickel alloy tubing (Schedule 7939) for Norfolk, Va., and Mare Island yards.

The South

• **Newport News Ship Building & Dry Dock Co.,** Newport News, Va., plans expansion, including additional shipways, docks, mechanical shops, and other structures, with cranes, conveyors and other mechanical-handling facilities for Navy Department. Cost about $3,000,000. Fund in amount noted is being arranged.

Cities Service Defense Corp., Shreveport, La., has been organized as an affiliated interest of Cities Service Co., 60 Wall Street, New York, headed by three officials of Arkansas Natural Gas Corp., Shreveport, a subsidiary, to build new plant at Marche, Ark., for production of ammonium picrate for government. Plant will include power house, machine and maintenance shops, pumping station and other structures. Cost about $8,000,000, fund in that amount to be secured through Defense Plant Corp., Washington. Completion is scheduled in about 10 months. D. W. Harris, vice-president and general manager; B. R. Muirhead, treasurer, and H. T. Goss, chief engineer, all Arkansas Natural Gas Corp., will head new organization.

City Council, Sebring, Fla., plans expansion and improvements in municipal light and power plant, including equipment, for increased capacity at new Army flying school to be built near city. Cost about $150,000. Financing will be arranged through Federal aid.

Ross-Meehan Foundries, Inc., 1601 Carter Street, Chattanooga, Tenn., stoves and stove castings, plans one-story foundry addition. Cost close to $40,000 with equipment.

Sinclair Refining Co., Sand Springs, Okla., plans rebuilding part of oil refinery near Seminole, Okla., recently destroyed by fire, mainly centered in distillation division and storage department, where 28 1000-bbl. storage tanks were demolished. Loss close to $1,000,000 with equipment. Main offices are at 630 Fifth Avenue, New York.

Houston Shipbuilding Corp., Chronicle Building, Houston, Tex., plans further expansion in shipbuilding plant in course of construction on Irish Bend Island, to double capacity. Work will include nine new shipways, duplicating number now under way, machine shops, docks and other structures. Cost about $7,000,000, fund in that amount to be secured through United States Maritime Commission, Washington, which will use facilities for government vessels. Complete project, including

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work under way, will represent investment of about $15,000,000.

Owen Tool Co., Sixth and Munger Streets, Pasadena, Houston, Tex., oil well tools, etc., plans one-story addition. Cost close to $50,000 with equipment.

Central States

● **Eastern Machinery Co.,** 1000 Tennessee Avenue, Cincinnati, machine tools and parts, has let general contract to Meyer-Hecht Co., 2824 Stanton Avenue, for one-story addition, 68 x 140 ft., and improvements in present plant. Cost close to $85,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architects; A. M. Kinney, Inc., Enquirer Building, is consulting engineer.

City Council, Miamisburg, Ohio, will take bids soon for extensions and improvements in municipal power plant, including new boiler units, stokers and auxiliary equipment. Fosdick & Hilmer, Union Trust Building, Cincinnati, are consulting engineers.

Ohio Rubber Co., Willoughby, Ohio, mechanical rubber goods, rubber flooring, etc., has let general contract to Gordon Rutland, Lost Nation Road, for new one-story plant, 90 x 240 ft., at Cleveland, for general production, storage and distribution. Cost over $65,000 with equipment.

Galanot Products Co., Alliance, Ohio, traction devices and equipment for motor trucks and tractors, has purchased former car barns of Stark Electric Railway Co. and six acres adjoining, and will remodel for branch plant. Property will be developed for main works in future.

Cincinnati Steel Castings Co., 3212 Spring Grove Avenue, Cincinnati, high and low carbon steel, nickel chrome and other steel castings, has asked bids on general contract for new one-story foundry and plant, 139 x 289 ft., on Alabama Street. Cost over $175,000 with equipment. G. A. Gast Engineering Co., Hazen Building, is engineer.

Black Boring & Machine Co., 4909 Luther Avenue, Cleveland, boring and other machinery and parts, will ask bids soon on general contract for one-story addition, 50 x 150 ft. Cost over $60,000 with equipment. Edward G. Hoefler, 5005 Euclid Avenue, is architect and engineer.

Board of Education, Springfield, Ohio, plans one-story vocational shop on Selma Road, 60 x 160 ft. Cost close to $90,000 with equipment.

Sandusky Metal Products Co., Sandusky, Ohio, steel stampings, etc., will take bids soon on general contract for one-story addition. Cost close to $45,000 with equipment.

Durham Mfg. Co., Muncie, Ind., metal products for household service, plans expansion, including additional equipment, for production of anti-aircraft projectiles for Navy Department and semi-tank mines for Army. A loan of $250,000 has been arranged through RFC for project.

Union Electric Co. of Missouri, Inc., Twelfth and Locust Streets, St. Louis, has arranged financing to provide fund of about $10,000,000 for expansion in plants and system, majority of appropriation to be used for further extensions in steam-electric generating station at Venice, Ill., to include installation of an 80,000-kw. turbine-generator as third unit at plant, with auxiliary equipment.

War Department, Major H. A. Montgomery, Wright Building, Tulsa, Okla., district engineer, has let general contract to Dunning-James-Patterson Co., Oklahoma City, for new supply and repair depot for Air Corps about five miles from Oklahoma City, comprising two operations hangars; airplane equipment, maintenance and repair shops; gas and oil storage units; chemical storage building; grease and oil storage tanks and facilities; two main depot supply buildings; warehouses; water reservoir and system; pumping station; steam power plant and other structures. Fund of about $14,000,000 has been arranged for project.

Barrett Equipment Co., 2101 Cass Avenue, St. Louis, brake equipment, tools and other mechanical products, has let general contract to Murch-Jarvis Co., Inc., 111 North Fourth Street, for one-story addition, about 50 x 130 ft. Cost over $50,000 with equipment. Hari Van Hoefen, 408 Pine Street, is architect.

Ford Motor Co., Dearborn, Mich., has asked bids on general contract for one and three-story L-shaped addition, 700 x 3200 ft., and 128 x 500 ft., to branch plant in course of erection at Ypsilanti, Mich., for production of bomber airplanes for government. This will supplement a main assembling plant, same size, under way for several weeks. Entire project will represent an investment of about $47,620,000, of which approximately $15,658,000 will be expended for equipment. Fund in amount noted has been provided by Defense Plant Corp., Washington. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

St. Claire Tool Co., 621 Beaufait Street, Detroit, has let general contract to Cooper Construction Co., Maccabees Building, for one-story addition. Cost close to $45,000 with equipment. H. E. Beyster Corp., General Motors Building, is architect and engineer.

Gerity-Adrian Corp., Adrian, Mich., James Gerity, president, organized to manufacture metal stampings for automobiles, has purchased former local works of Line-O-Scribe Co. for plant, with facilities for employment of about 150 men.

American Blower Corp., 6000 Russell Avenue, Detroit, mechanical draft apparatus, air-conditioning equipment, etc., plans one-story addition to plant at 8111 Tireman Avenue. Cost close to $90,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

Motor Tool Mfg. Co., 12281 Turner Avenue, Detroit, carbide tools, chucks, cutters, etc., plans new one-story plant and office unit. Cost close to $45,000 with equipment. R. H. Neubrecht, 233 John R. Street, is architect.

Crane Co., 836 South Michigan Avenue, Chicago, has let general contract to Dahl-Stedman Co., 11 South LaSalle Street, for one-story addition to plant at Kedzie Avenue and Forty-first Street, 52 x 125 ft., for liquid storage service. Cost over $60,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

W. F. & John Barnes Co., 301 South Water Street, Rockford, Ill., lathes, parts, etc., has let general contract to E. W. Schmeling & Son, 1031 School Street, for one-story addition. Cost close to $40,000 with equipment.

National Rivet & Mfg. Co., Waupun, Wis., rivets, studs and kindred products, plans one-story addition, 54 x 121 ft., with extension, 52 x 54 ft. Cost over $65,000 with equipment. Roger A. Sutherland, 259 East Wells Street, Milwaukee, is architect.

Board of Water and Light Commissioners, Muscatine, Iowa, asks bids until Aug. 12 for coal and ash-handling equipment, mechanical draft apparatus, boiler feed pumps, turbine and boiler room switchgear, and other equipment for municipal power plant expansion. Stanley Engineering Co., Muscatine, is consulting engineer.

Unity Refining Co., Kalispell, Mont., plans rebuilding part of oil refinery recently destroyed by fire. Loss close to $75,000 with equipment.

Wittek Mfg. Co., 4305 West Twenty-fourth Place, Chicago, punch press feeds, hose clamps and kindred metal goods, has let general contract to H. N. Samuel, 165 West Wacker Drive, for one-story addition, 68 x 125 ft. Cost close to $45,000 with equipment.

Menominee Sugar Co., Green Bay, Wis., has let general contract to E. H. Regal Construction Co., 136 South Adams Street, for three-story addition to beet sugar mill near city, about 23 x 68 ft.; also for two-story addition to office building. Cost about $50,000 with equipment. Foeller, Schober, Berners, Safford & Jahn, 310 Pine Street, are architects.

Ralston-Purina Co., 835 South Eighth Street, St. Louis, cereal foods, grains, etc., has let general contract to Jones-Hettelsater Construction Co., Mutual Building, Kansas City, Mo., for new one-story soy bean processing mill at Iowa Falls, Iowa, with adjoining building for feed mill. Cost about $300,000 with equipment.

Western States

● **Boeing Airplane Co., Inc.,** Marginal Way, Seattle, has let general contract to Austin Co., Dexter-Horton Building, for new plant at Renton, Wash., for production of bomber aircraft for government, including boiler house and other mechanical buildings. Cost about $10,000,000. Fund in that amount will be supplied by Defense Plant Corp., Washington.

Bureau of Reclamation, Denver, asks bids until Aug. 18 for one 103,000-hp. vertical-shaft hydraulic turbine, and one oil-pressure, actuator-type governor for Shasta hydroelectric power plant, Central Valley project, Cal. (Specification 975); until Aug. 19 for three 34,600-hp. vertical-shaft hydraulic turbines, and three oil-pressure actuator-type governors for Keswick hydroelectric generating station, same project (Specification 976).

Bendix Aviation, Ltd., Union Air Terminal, Burbank, Cal., aircraft instruments and parts, has let general contract to Austin Co. of California, Los Angeles, for new works at 11600 Sherman Way, North Hollywood, consisting of main one-story plant, 240 x 350 ft., and two two-story adjoining buildings, 28 x 350 ft., and 46 x 170 ft., respectively, for general operating, service and offices. Cost about $500,000 with equipment. H. L. Gogerty, 1717 North Vine Street, Hollywood, is architect.

Moore Dry Dock Co., Inc., foot of Adeline Street, Oakland, Cal., has let general contract to D. W. Nicholson, 357 Twelfth Street, for one-story pipe shop, paint and oil shop, and generator building. Cost about $43,000 exclusive of equipment.

Isaacson Iron Works, Inc., 2917 East Marginal Way, Seattle, marine forgings, automobile bodies and other products, plans one-story addition for expansion, particularly for heavy forgings. Cost over $200,000 with equipment.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has approved plans for extensions in Midway steam-electric generating plant near Bakersfield, Cal., including new 75,000-kva. turbine-generator unit and auxiliary equipment.

Canada

● **Department of National Defense for Air,** Ottawa, Ont., has let general contract to M. F. Schurman Co., Ltd., Water Street, Summerside, P.E.I., for seven one-story buildings at Bombing and Gunnery School No. 6, Charlottetown, P.E.I., for shop and other mechanical service. Cost about $160,000 exclusive of equipment.

Canadian National Railways, 360 McGill Street, Montreal, will begin addition to engine house at Turcot Yards, and one-story foundry, for which general contract recently was let to W. W. Steward, 1440 St. Catherine Street West. Cost close to $160,000 with equipment.

Brights Wines, Ltd., Dorchester Road, Niagara Falls, Ont., will begin work soon on one-story addition, 25 x 155 ft., for expansion in general production department and bottling division. Cost over $50,000 with equipment. Findlay & Mann, 449 Queen Street, are architects.

Canada Machinery Corp., Ltd., Galt, Ont., has let general contract to G. H. Thomas & Son, Ltd., 45 Dickson Street, for new one-story plant, 120 x 140 ft. Cost close to $150,000 with equipment.

Aluminum Co. of Canada, Ltd., 1155 Metcalfe Street, Montreal, will start work at once on new plant at Shawinigan Falls, Que., to cost $800,000 with equipment.

American Can Co., Medical Arts Building, Hamilton, Ont., is erecting plant addition to cost $50,000. W. H. Cooper Construction Co. is general contractor.

Wallace Barnes Co., 274 Sherman Avenue North, Hamilton, Ont., bronze and steel wire springs, etc., has awarded general contract to W. H. Cooper Construction Co., Medical Arts Building, for plant addition to cost $75,000 with equipment.

Hayes Steel Products, Ltd., Merritton, Ont., grinding balls, rock bits, etc., has awarded general contract to Ontario Construction Co., Ltd., 31 Queen Street, St. Catharines, Ont., for $75,000 plant addition.